Stimulating Wind Energy in Nebraska's Panhandle

Wind Energy Survey Report

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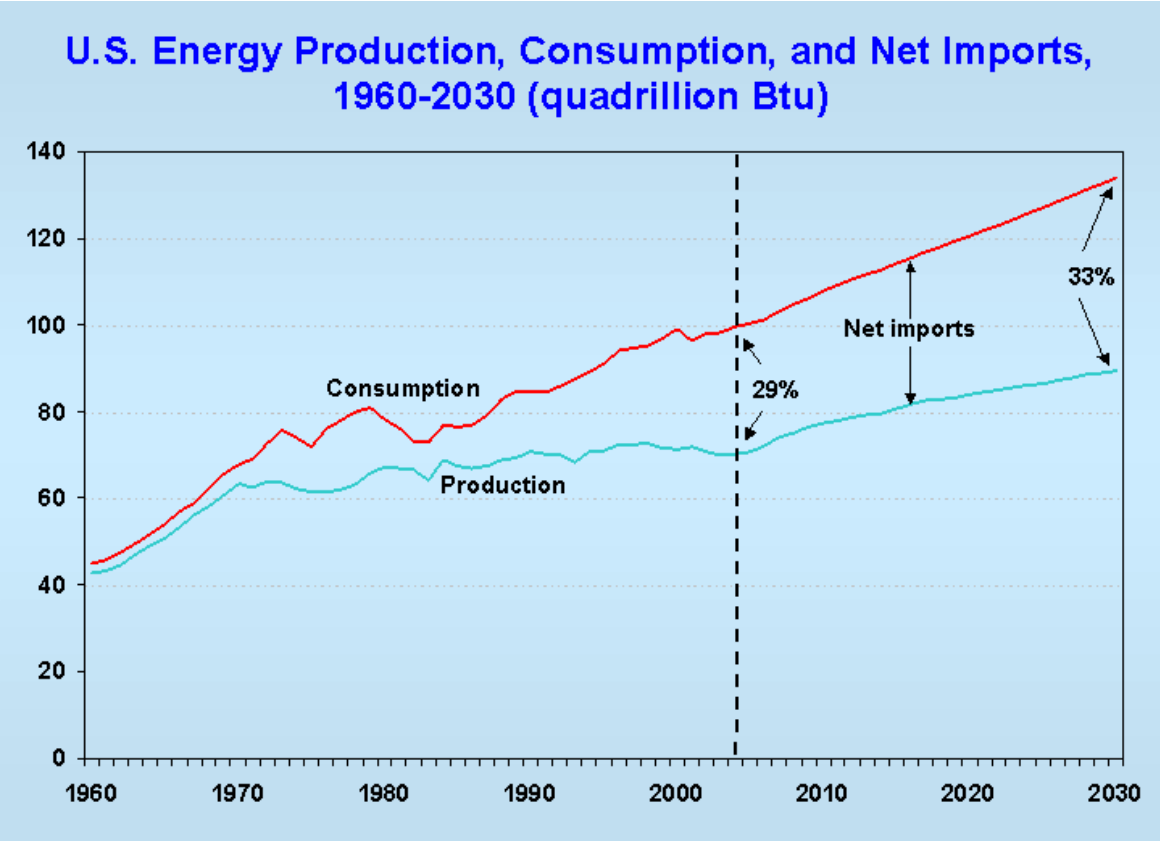
"We understand that wind power is different and presents challenges to operation of the electricity system, but we want clean energy. So let's determine how best to incorporate wind and operate the system in ways that accommodate its characteristics."

- Edgar A. DeMeo,
Accelerating Wind Power Development in Nebraska

Producing energy will likely be one of the greatest economic development opportunities for rural areas in the coming decades. With experts predicting that our **domestic energy consumption will greatly outpace domestic energy production over the next 25 years**, [1] (see graph below) there is a widespread movement to expand existing energy operations and harvest new opportunities, most of which lie in rural areas.

The Nebraska Panhandle already benefits greatly from producing and transporting energy. The distribution of coal pumps millions of dollars into our regional economy, over half of Nebraska's oil and almost all of the state's natural gas production occurs in the Panhandle, and uranium is mined in Dawes County, not to mention the many businesses that directly support these industries.

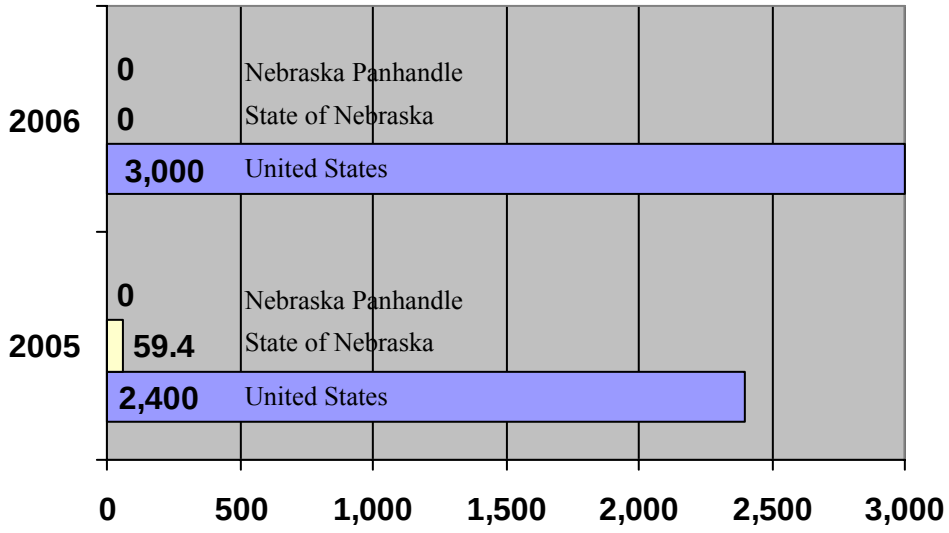
While these industries, especially the transporting of coal, will continue to provide the greatest economic impact to our region in the energy sector, there are many other energy-related opportunities the Panhandle can take advantage of such as ethanol, bio-mass, bio-diesel, geo-thermal, and wind.



In evaluating these energy opportunities for our region, it is apparent that wind generated energy has enormous potential for our state and region. Theoretically, **Nebraska has the sixth greatest potential for wind energy in the United States**,[2] **yet greatly trails many states which have far less potential**.[3]

For instance, in 2005, more than 2,400 megawatts of wind energy was installed in the United States according to the American Wind Energy Association (AWEA). Yet, less than 2.5% of this figure occurred in Nebraska, none of which was constructed in the Panhandle. **For 2006, the wind industry is expected to bring on line over 3,000 additional MW with no projects planned in Nebraska**.[4]

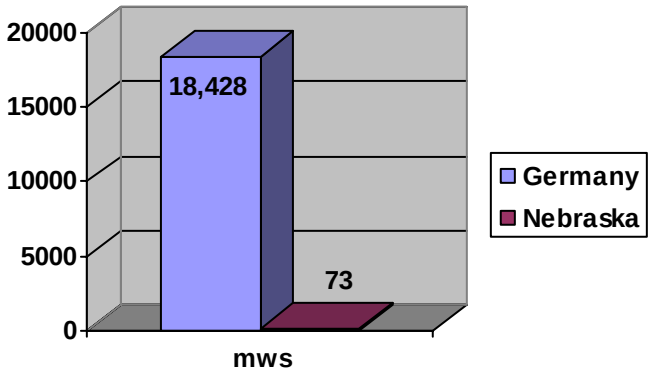
Installed Capacity of Utility Scale Wind Power, 2005 and 2006



Source: AWEA

From an international perspective, **Nebraska has 180% of Germany's wind energy potential,**[5] **yet Nebraska trails Germany in installed wind power 18,428 mw**[6] **to 73 mw**.[7]

Installed Capacity of Utility Scale Wind Power in Nebraska and Germany



Sources: wwea and awea

Note: Nebraska has 180% of Germany's wind energy potential

Introduction

According to the 2006 BP Statistical Review: "In absolute terms, the US recorded the highest growth in installed capacity, reaffirming its position as the third largest wind market, with a cumulative installed capacity of 9.2 GW. With 2,341 MW of new installations **US wind capacity grew by 36% in 2005**, significantly above the 6% increase in 2004. The main reason for high growth is the reinstatement of the Production Tax Credit, which provides a 1.8 cent/KWh credit for electricity produced from a wind farm during the first 10 years of its operation. Also high gas prices and supply problems caused by last year's hurricanes have increased awareness about the importance of indigenous energy supply."[8]

The most significant aspect of Nebraska falling behind other states wind energy production is that **wind is a rapidly growing industry in the US and Nebraska is not reaping its fair share of this market.**

Even though Nebraska has the 6th greatest wind potential, if all the planned wind projects are completed**, Nebraska's ranking will fall from an already underachieving 18th to just 28th out of only 29 states that produce 50mw or more of windpower.** [9] (See maps on page 6)

Despite the fact that Nebraska is falling significantly behind, **many leaders and residents in this state appear content to see Nebraska slip in these wind energy rankings**. Part of this **contentment may lie with two often repeated myths** that were repeated in the written surveys and oral comments, **these myths being that Nebraska has the lowest electricity rates in the United States (with Public Power often being given as an unverified reason why) and that developing wind energy will result in higher electric rates**. Pages 7 and 8 demonstrate that, according to the Nebraska Energy Office, the State of Nebraska does not have the lowest utility rates and 6 of the 9 states with cheaper electric rates have similar or much greater levels of wind energy. This includes Wyoming, Oregon and Washington which have far more wind energy than Nebraska.

PADD is thus exploring ways to enable, promote and stimulate wind generation in the Panhandle region through a four step process.

The first step in this process involved sending surveys in the Spring of 2006 to energy experts including utility providers, power producers, academia, politicians and other applicable persons such as wind energy advocates and environmental groups. The survey asked two basic questions:

A: Why does Nebraska produce significantly less wind energy than most of its neighboring states given Nebraska has the 6th greatest potential for wind energy in the U.S.?

B: What can the state, cities, counties, utility users, land owners, or other entities do to encourage more wind energy development?

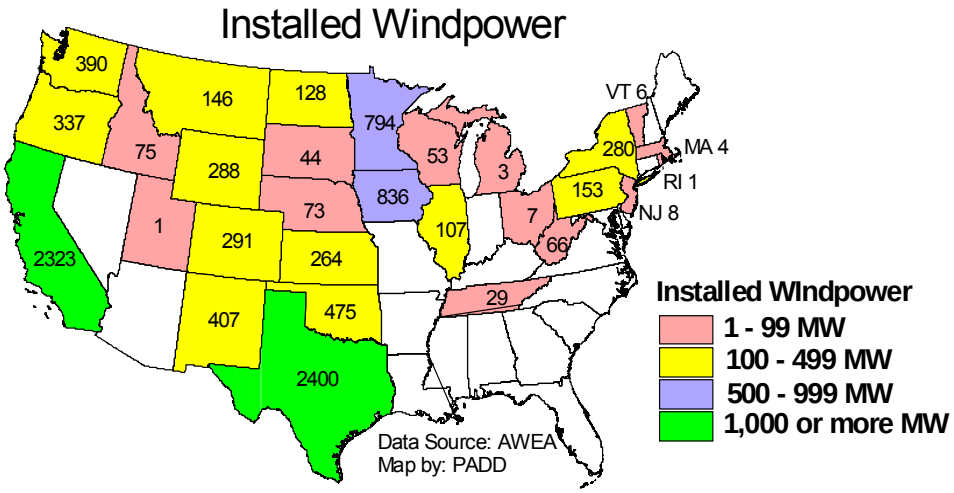
The Panhandle Area Development District (PADD) compiled the results from this survey and prepared a draft report using survey responses and some open source information. The draft was sent to all persons responding to the survey. The draft was also made available on-line with the website published in newspaper articles..

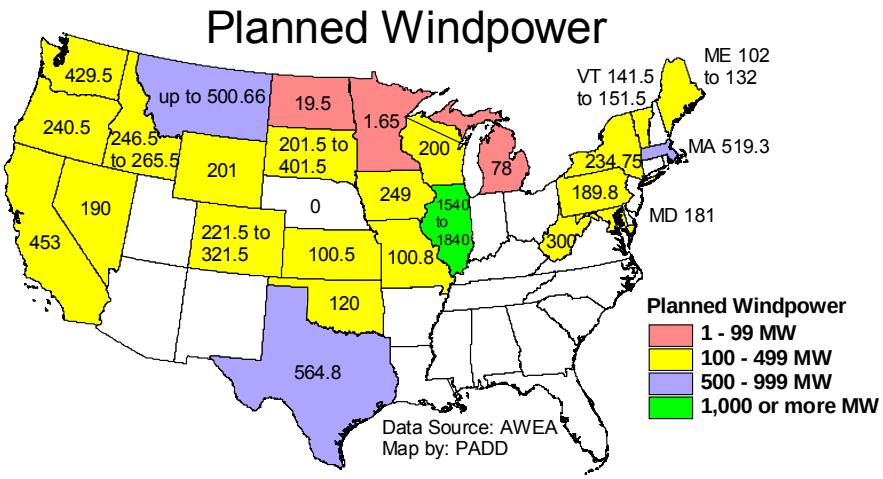
On July 14, PADD facilitated a meeting at the Harms Technology Center in Scottsbluff to discuss the wind energy draft report and develop effective strategies to stimulate wind development in Nebraska. (Every person who received a survey questionnaire was informed of this date) The meeting was attended by 26 guests, half of which represented public power districts or power generators. The other half of the attendees included land owners, politicians, government agencies, and economic development organizations. (There were not any environmental or wind avocation groups in attendance)

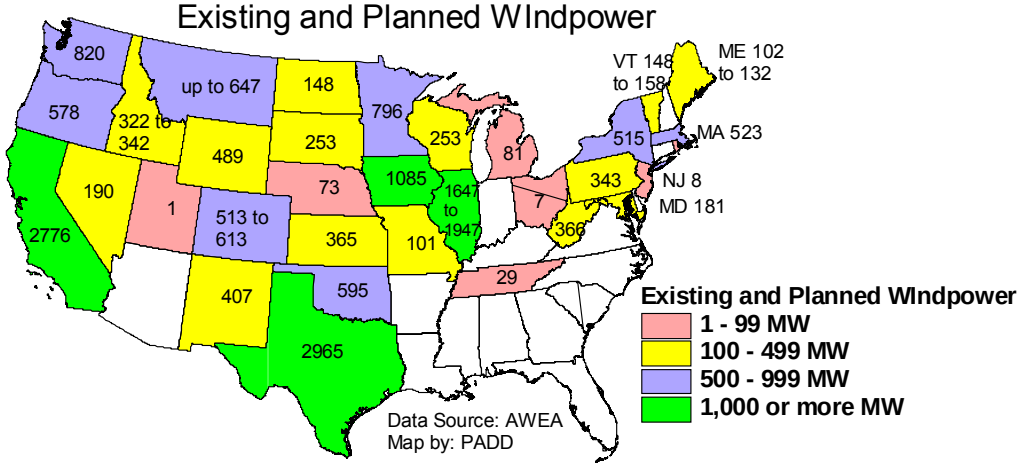
The draft report was then amended to incorporate relevant information received at the July 14 meeting and additional written comments received after the initial draft report was developed. A final draft was then circulated for comments and suggestions.

This document should be viewed as an assessment to find ways to enable, promote and stimulate wind generation in the Nebraska Panhandle. This report should not be taken as an indictment that any individual, group, or agency can, could or should develop more wind energy.

Even though Nebraska has the 6th greatest wind potential, if all the planned wind projects are completed, Nebraska's ranking will fall from an already underachieving 18th to just 28th out of only 29 states that produce 50mw or more of windpower. (data source, awea)







Data source:
http://www.awea.org/projects/ as of August 31, 2006

Introduction

Contrary to an often-repeated myth, Nebraska does not have the lowest electricity rates in the United States.

Nebraska does have the tenth lowest electricity rates in the country, thanks most likely to access to cheap Wyoming coal. It is likely no coincidence that the fourteen states with the cheapest electricity rates either have significant coal production or else have relatively good rail access to top coal producing states. (Oregon and Washington also have access to good hydro-resources)

Of particular interest, six of the nine states with cheaper electricity rates than Nebraska have similar or greater wind energy production than Nebraska. This includes Wyoming, Oregon, and Washington which have far greater wind development than Nebraska.

The bottom line is there are many variables that go into the price of electricity. However, from this table one can ascertain that there likely is a close correlation between access to major coal fields and cheap electric rates while, contrary to another often-repeated myth, there is likely no correlation between wind energy development and high utility rates.

The map on the next page helps illustrate the geographic influences on utility rates.

Sources:
Electric Rates:
Nebraska Department of Energy, Cents per Kilowatt Hour, August 2006

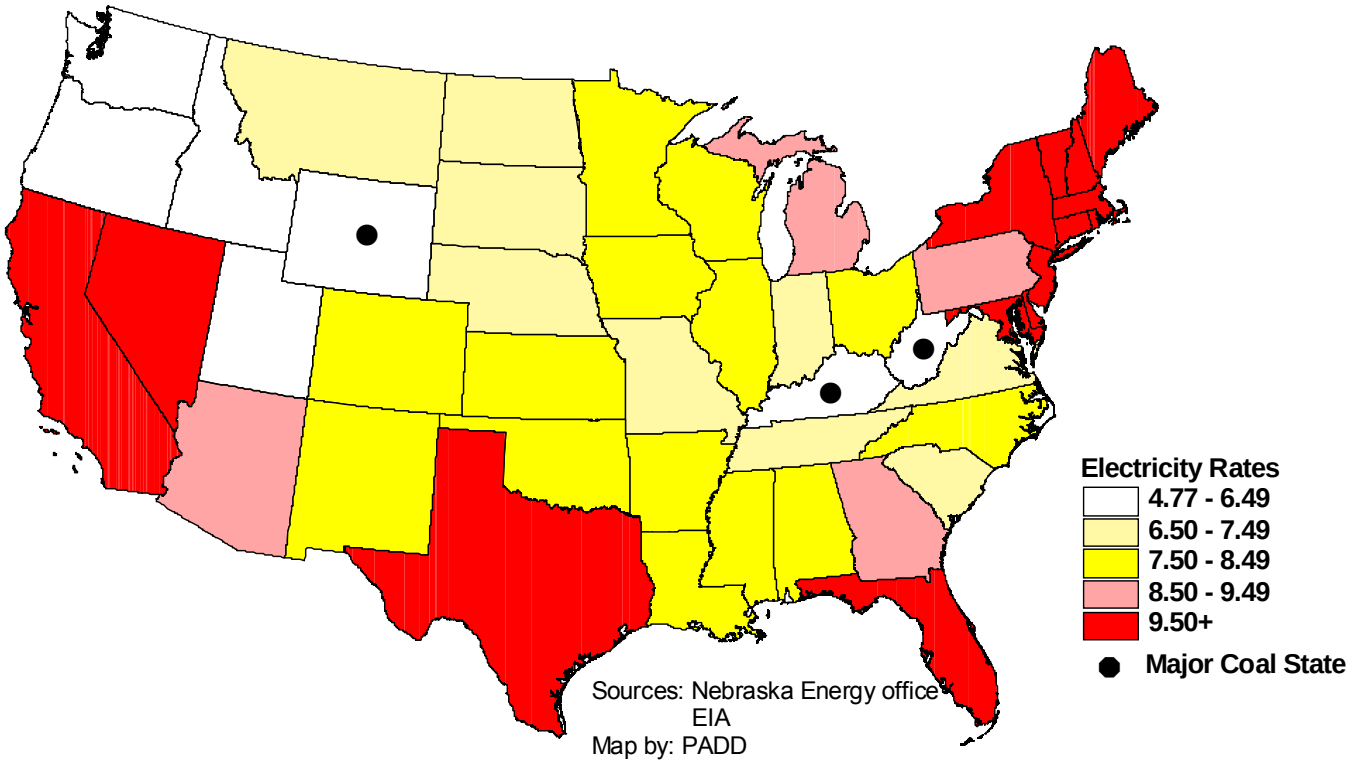
Wind Energy Production:
AWEA, Megawatts, September 2006

Coal Production:
EIA, thousand short tones, 2005

Comparison of Electric Rate to Wind and Coal Production

Electric Rank	State	Electric Rate	Installed Wind	Coal
1	Idaho	4.77	75	0
2	**West Virginia**	5.09	66	153,650
3	**Wyoming**	5.37	288	404,319
4	Washington	5.98	390	5,266
5	**Kentucky**	6.27	0	119,734
6	Oregon	6.35	337	0
7	Utah	6.39	1	24,521
8	North Dakota	6.50	128	29,956
9	Indiana	6.70	0	34,457
10	Nebraska	6.89	73	0
11	South Dakota	6.99	44	0
12	Montana	7.00	146	40,354
13	Virginia	7.22	0	27,743
14	Tennessee	7.27	29	3,217
15	Missouri	7.30	0	598
16	South Carolina	7.46	0	0
17	Minnesota	7.55	794	0
18	Kansas	7.60	264	171
19	Colorado	7.62	291	38,510
20	New Mexico	7.67	407	28,519
21	Illinois	7.78	107	32,014
22	Iowa	7.79	836	0
23	North Carolina	7.84	0	0
24	Alabama	8.02	0	21,339
25	Arkansas	8.10	0	3
26	Ohio	8.11	7	24,718
27	Oklahoma	8.12	475	1,856
28	Mississippi	8.38	0	3,555
29	Louisiana	8.41	0	4,161
30	Wisconsin	8.48	53	0
31	Georgia	8.70	0	0
32	Arizona	8.80	0	12,072
33	Pennsylvania	8.96	153	67,494
34	Michigan	9.04	3	0
35	Nevada	10.13	0	0
36	Florida	10.53	0	0
37	Maryland	11.04	0	5,183
38	Texas	11.15	2400	45,939
39	Delaware	11.18	0	0
40	Vermont	11.62	6	0
41	Washington DC	12.24	0	0
42	Maine	12.28	0	0
43	New Hampshire	13.27	0	0
44	Alaska	13.46	2	1,454
45	California	13.97	2323	0
46	Rhode Island	14.11	1	0
47	New Jersey	14.25	8	0
48	New York	15.19	280	0
49	Connecticut	15.49	0	0
50	Massachusetts	16.19	4	0
51	Hawaii	21.73	49	0

Electricity Rates by State



"This scheme of combustion to get power makes me sick to think of--it is so wasteful ... we should utilize natural forces and thus get all of our power. Sunshine is a form of energy, and the winds and the tides are manifestations of energy."
- Thomas Edison, in the year 1910

The survey responses received generally fell into the following categories:

- Public Power/Private Development/State Law
- Least-Cost Mandate
- State Incentives for Wind Energy
- Transmission
- Wind Dispatchability
- Wind Data
- Finance Issues
- Wind Turbine Placement

The following pages will present a discussion of these issues in their respective sections. The following narrative is developed using comments from the wind energy survey. These comments have been amended in many instances to provide for better narrative flow. Where noted, open sources of information are used to supplement the information received in the survey.

Each issue discussion is concluded with possible methods to stimulate wind energy development in Nebraska. The possible methods are then listed in a final section along with some pros and cons associated with the possible methods.

The opinions of the survey respondents should not be assumed to be the opinion of the Panhandle Area Development's board of directors or its staff.

"The journey of a thousand miles begins with a single step,"
-- Confucious

A common misperception regarding why Nebraska lags its potential in the generation of wind energy is because Nebraska is a Public Power state. This is not just an over-simplification of reality, it is simply not true. **Not only are private energy generators not precluded from locating in Nebraska, as a public power state, Nebraska could theoretically lead the nation in wind-generated electricity if adequate transmission, production incentives, financing, markets, public support, and legal ability were provided.**

There are many examples of wind energy projects undertaken in the public sector. Much of the wind developments in Colorado and Wyoming, for example, arose because these states have active public utility commissions who worked hard to encourage wind development.

In Nebraska, **NPPD and MEAN have demonstrated their ability and willingness to develop mid-to-large scale wind farms.** NPPD and a consortium of municipal utilities recently developed a 59.4 mw facility near Ainsworth. MEAN developed a 10.5 mw facility near Kimball which involves some export to other states.

The new Ainsworth Wind Facility is the largest wind facility in Nebraska. To date, the performance of this facility has been above expectations. During the fall and winter, the load factor has been 50%, which is extremely good performance. With the seasonal weather changes in spring and summer, wind velocity and frequency are expected to be less, resulting in lower capacity factors in those seasons. Normal costs at Ainsworth are projected to be in the range of $37-$40 per MWH at an annual capacity factor of approximately 41%.

NPPD is monitoring the data from the Ainsworth site very closely and when they have a full year of operation they will review the information and decide if it is in the best interest of NPPD and its customers to add additional wind energy. **The Ainsworth facility has room for an additional 15 MW of generation and if it will be cost effective NPPD may add on to this facility.** They will also be looking at other resources for funding this project as well as other renewable energy projects.

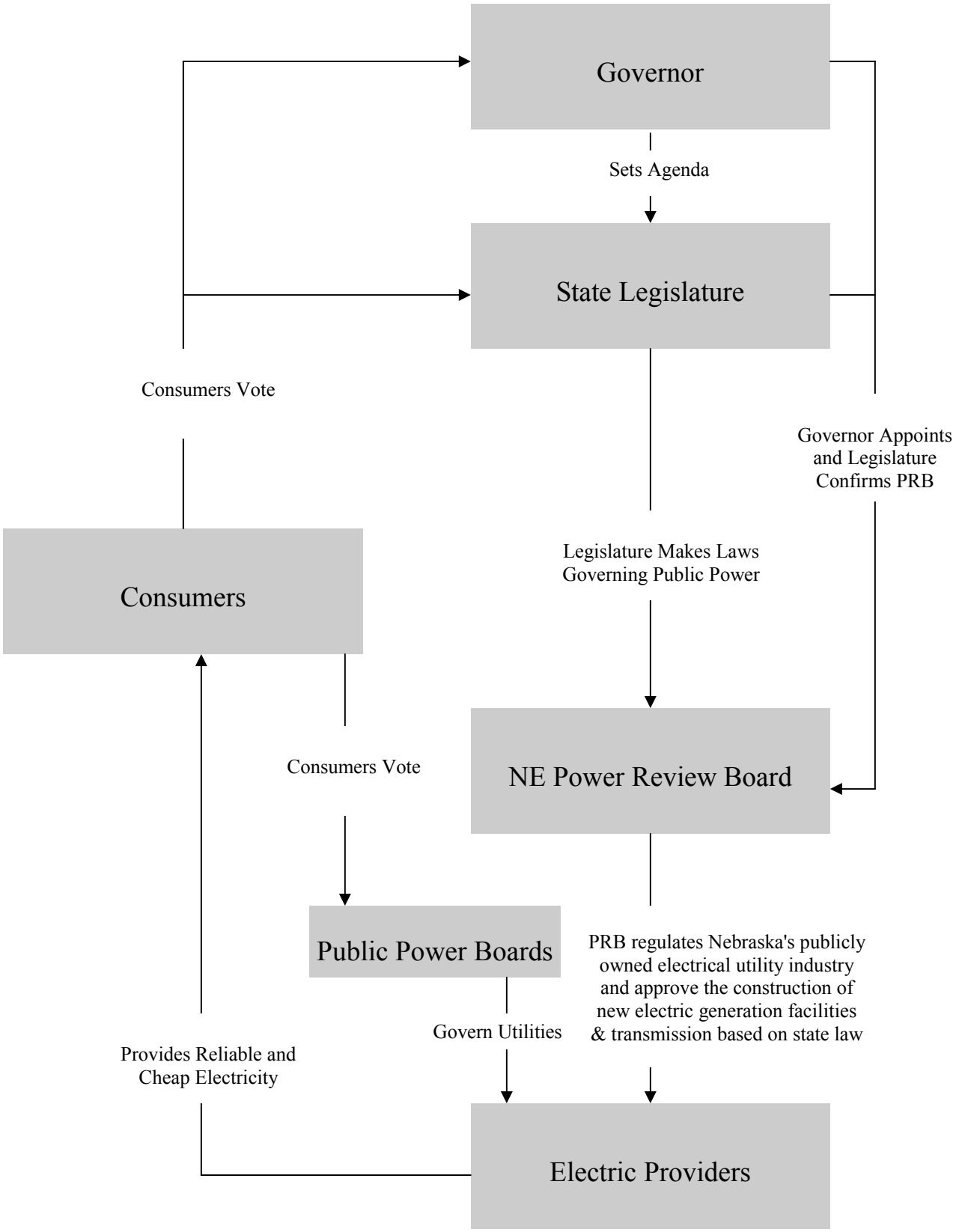
NPPD has taken an active lead in exploring ways to make more winds projects feasible in Nebraska. They are conducting some site surveys throughout the state to assess wind potential and are working with the University of Nebraska to establish an energy research center.

Many misperceptions about Public Power's inability to develop more wind energy are more likely due to state laws and government policies, not the public power set-up.

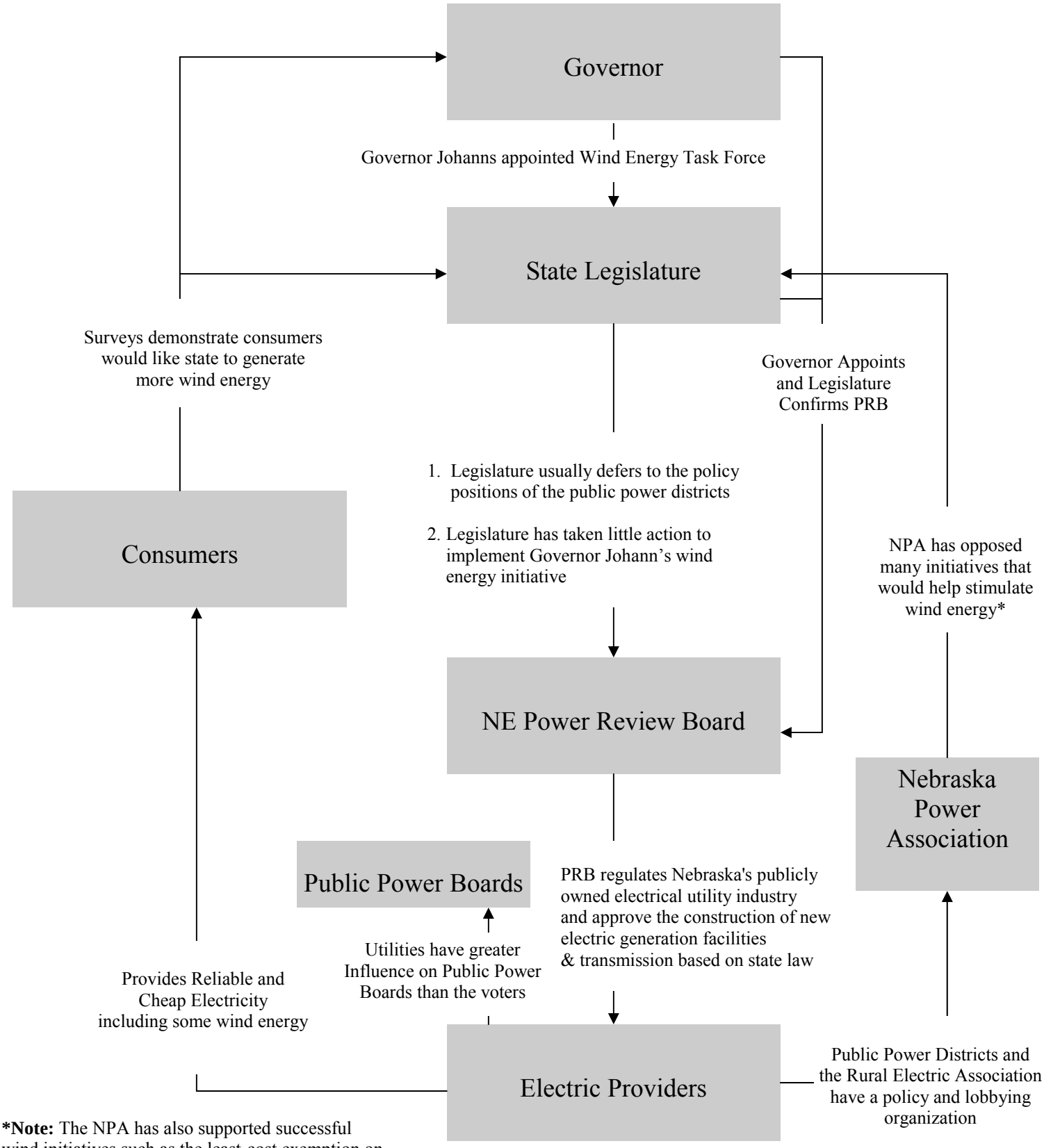
That being said, while the public power utilities have shown a willingness to develop wind power, it appears they prefer to progress wind power on their own terms and have actively influenced the state legislature to curb many initiatives that could potentially accelerate the development of wind power generation in Nebraska.

As illustrated in the diagrams on pages 11 and 12, public power is set-up to be a very democratic process where consumers vote for the legislature which establishes the rules that govern the utilities that supply electricity to consumers. However, this process has become somewhat disjointed as the Public Power Districts and the Rural Electric Association have formed a policy and lobbying organization called the Nebraska Power Association. (NPA). This organization has been successful in lobbying to the point where **the Legislature usually defers to the policy positions of the public power districts**.

How Public Power Theoretically Works in Nebraska



In Reality, How Public Power Tends to Operate in Nebraska in Relation to Wind Energy
(not a literal illustration, based on opinions of survey participants and other studies)



***Note:** The NPA has also supported successful wind initiatives such as the least-cost exemption on wind farms of less than 10mw

There are many examples of how this arrangement has slowed the progress of wind energy in Nebraska. As one survey respondent wrote, " Legislation to enact a Renewable Portfolio Standard (RPS) has been introduced 3 times in the past 11 years. It has been opposed by members of the NPA who have testified that the NPA supports only a voluntary approach in which each public power district could decide the amount of renewable energy in its energy portfolio and the time frame in which it develops the additional renewable energy. The public power district representatives have also taken the position that they will not support an RPS unless a federal RPS is adopted. However, when the RPS was included in the federal Energy Policy draft, the Nebraska public power districts successfully lobbied to have all public power districts excluded from this requirement."

The NPA has also successfully opposed other wind promoting legislation such as Green pricing, and a public benefit fund, according to a survey response.

These efforts are contrary to the wishes of Nebraska citizens who are overwhelmingly in support of wind energy. In 2003 NPPD conducted a Deliberative Poll in which they polled over 100 of its customers throughout the state. The results showed that 96% of those polled said they were in favor of NPPD developing 200 megawatts of wind energy even if it meant an increase of $1 to $2 in their monthly utility bills. Thirty-seven percent thought that more than 200 megawatts of wind energy should be developed by NPPD.

A separate poll was conducted by the University of Nebraska Center for Applied Rural Innovation in March of 2005. The Center received 2,851 responses from 6,250 randomly selected households in Nebraska's 84 rural counties. Nearly 90% of respondents believe the government should encourage the use of renewable energy sources. Sixty-five percent also believe alternative energy sources are better for the environment than traditional fossil fuels, while more than 70% of respondents believe 10% of Nebraska's electricity should come from alternative energy sources, and 84% said wind power should be produced and used locally.

One survey respondent wrote in regard to these surveys: "Though these numbers are excellent there is a further need for public education including the encouragement of citizens to elect board members in favor of renewable energy and to demand of their current board members the development of renewable energy."

In fairness to the public power entities, much of their opposition may be due to state laws that require Nebraska's public power suppliers to provide the public with its electricity needs in the most economical, feasible and reliable means possible. Although wind facilities are becoming more and more cost-competitive, they usually cannot produce electricity for the same cost as other more traditional facilities, particularly coal. There are also feasibility and reliability issues associated with wind power. (These issues are provided their respective sections)

As one respondent stated "Electricity in Nebraska is comparatively inexpensive. Our public power system has been extremely effective in keeping the cost of electricity low. This makes it very challenging for alternative energy sources such as wind to get much traction."

Another respondent stated: "A major shift in organizational focus will have to happen within public power to allow for large scale wind power development in Nebraska. In the past, the **focus has been on production and distribution for local consumption. The new paradigm will involve changing the focus to local production for export.** In particular, the local REAs are not at all set up for that kind of model of operation and certainly will need assistance and encouragement to make such a transition."

It should also be noted that **regardless of the NPA's lobbying effort, it is ultimately the legislature's decision to set the path of public policy for public power.** (It is also lawful and acceptable for the NPA to lobby on behalf of the public utility providers.)

A recent study concluded that in Nebraska, it seems the legislature tends to defer heavily to utility managements on electric power matters and the general public voice in the state legislature is not as strong as those of entities that prefer that status quo with respect to Nebraska's energy sector. [12]

This same study also found that the legislature usually defers their decisions to the public utilities because **the major utilities have boards that are elected by the public. However, these boards tend to be influenced far more from utility management than by public desires and concern**. [13]

In the past, the executive branch has taken efforts to initiate wind energy generation. For example, Governor Johanns initiated a study and developed a task force in an effort to accelerate wind power development in Nebraska. However, **the legislature has done little to enact the proposals that arose from Governor Johanns' effort.**

Tax Credit Disparity

Probably the biggest disadvantage in developing wind in a Public Power State is that the Federal Government tax credits are more favorable to the private sector than public entities.

In surrounding States, a large amount of wind energy has been developed due to the Federal Government's Production Tax Credit (PTC) available to investor owned utilities, as well as state imposed renewable energy mandates.

Investor-owned utilities have taken advantage of these tax credits which significantly lessens the net operating cost of wind generation. Additionally, all investor owned utilities enjoy at least 10 years assurance that they will receive renewable tax credits for the investment. These credits go a long ways to making wind energy's cost in line with other traditional resources.

The **public utilities' equivalent of the PTC is the Renewable Energy Production Incentive (REPI). This incentive must go through the annual federal budget and appropriation process and has been greatly under-funded. Thus the benefit of the REPI is not on par with tax credits the private sector generators receive nor is there the same long term assurance of funding.** For example, in 2005 appropriated funds were $4.96 million, and over $45 million would have been required to fully fund all projects that applied for funding.

Furthermore, as more public utilities invest in renewables over time, the credit given to each existing and new renewable resource shares proceeds out of the same pool of funds and thus the credit to each project continues to shrink. This is a significant issue that is impairing growth in pubic systems.

MEAN has worked with American Public Power Association (APPA) and other public power systems nationwide to lobby Congress to improve this situation.

Private Developers/CBEDs

One way for Nebraska to overcome the tax credit discrepancy and provide increased capital for infrastructure is to have private developers or Community Based Energy Development Organizations (C-BEDS) generate wind power in Nebraska.

Before discussing this option, one of the most popular misconceptions about being a public power state must be clarified in that private developers ARE legally permitted to generate electricity in Nebraska. One survey respondent supplied a very clear explanation of the laws governing private power generation. They wrote:

"According to a 1996 Nebraska Attorney General's Opinion (#96073), although a private power supplier may be able to build and operate an electric plant in Nebraska, it appears that **private electric suppliers are prohibited from serving customers who are located within a public power agency's service area who are already being served by the public power agency, at least until it can show that the current supplier is unable or unwilling to provide adequate electric service.**

In Nebraska each of the public power districts has an elected board which determines policy related to the district which includes the setting of rates. The public power districts are subject to the Nebraska Power Review Board (NPRB) …. which has limited jurisdiction over electric generation. The NPRB's jurisdiction and authority includes, but isn't limited to: approving applications for new electric power generating facilities, the establishment of each public power district's territory, and approval of transmission lines. The **NPRB may grant a permit if it finds that the application for the proposed facility meets the statutory requirement contained in Neb. Rev. Statute 70-1014 that the facility will 'serve the public convenience and necessity and that the applicant can most economically and feasibly supply the electric service resulting from the proposed construction without unnecessary duplication of facilities or operations.** '

There are no other state statutes which would prohibit a private developer from seeking a permit to construct an electrical generating facility to sell electricity in Nebraska. However, when Nebraska changed to a statewide publicly owned electrical power system **in the 1930's, statutes were enacted which grant public power districts and municipalities the authority to condemn any private electrical generating facility located within their jurisdiction. As a result of the condemnation statutes no private development has occurred in Nebraska due to the risk of condemnation by a power district. "**

In other states, independent power producers have carried out much of the wind development primarily because they are generally more comfortable and experienced with wind power. Many utilities prefer to purchase wind through a power purchase agreement and leave the business of building and operating the plant to a third party. **By historical precedent, this option appears to be precluded in Nebraska,** which removes from consideration an avenue for wind development that has been very successful in other states. Perhaps of greater importance, it **precludes access to the federal PTC**, which by itself could make many Nebraska wind projects competitive on a least cost basis in conventional terms today. [14]

Several survey respondents indicated an enormous opportunity will be the encouragement of commercial power producers or CBEDS to come to NE to generate wind energy. Respondents stressed the potential lies not necessarily in providing electricity locally, but rather in economic development benefits of selling power to other markets, especially in Colorado.

A good example of this is Vail, Colorado's effort to offset 100% of its electricity needs by purchasing wind power credits from producers in Minnesota, Kansas, North Dakota, and South Dakota. [15] (Noticeably absent from this list is Nebraska.) This may be a growing trend as officials in Pasadena, Anaheim and several other large cities announced they will not be renewing their contracts with cheap, coal-fired power due to strong evidence that carbon dioxide levels in the atmosphere grew significantly in 2005.[16]

Another advantage of private developers or CBEDS is that public power does not have a rate of return incentive. Since Nebraska utilities are nonprofit, or providing service to customers at cost, they get no rate of return on investing in wind resources. In all of the surrounding states, the investor owned utilities that are installing renewables as part of their portfolios are gaining an 8 - l3% rate of return for their investment that gets added to the power customer rates.

Developing CBEDs would be economically advantageous at the local level. Under a community-based plan, local landowners and investors could form a limited liability corporation to bring outside investors in to build wind turbines. Those investors would be entitled to a production tax credit and other incentives. A Nebraska public power utility could then purchase the wind energy or else it could be exported to another market. After 10 years, complete ownership of the wind energy facility would revert back to the local LLC.

The July 7, 2006 Omaha World Herald indicated that the **NPPD Board authorized management to buy output from a proposed 40mw wind farm that was proposed by a CBED in Northeast Nebraska. This would have been the first privately owned wind farm in Nebraska. However,** according to the August 15, 2006 Lincoln Journal Star, **NPPD shelved the project and tabled it indefinitely, leaving it up to the private corporation to bring the project back for review.**

Other Public Power Issues

- Public Power in Nebraska is very fragmented in its structure, thus an individual city may be controlled by three or more entities, all of which have separate governing boards and little, if any, coordination between them.

- **Most Nebraska power suppliers that purchase their electricity at wholesale have long-term contracts requiring them to purchase all their power needs from their current wholesale supplier**. Other public power utilities or investor-owned companies therefore could not sell any power produced at wind generation facilities to any of the contractually bound electric utilities until those contracts are either expired, amended or mutually terminated.

- Cities and communities in NE can also take advantage of the new federal law allowing for community aggregation whereby communities that wish to accelerate energy efficiency and renewable energy may aggregate together and become independent new customers requiring electricity providers to compete for their service. This may be hampered by present long-term contracts in which case only a state RPS mandate including state goals could allow aggregation for the purpose of obtaining renewable energy.

- The installation of wind resources in the surrounding states are often compromises for the state public utilities commission's rulings to allow traditional resources to be built. i.e. MidAmerican Energy in Iowa builds a 790 MW coal plant; in exchange they must build a 160 MW wind farm to pass state regulatory requirements.

- A survey respondent stated "Another change which must take place within the public power system **is incorporation of management and employees into the system who are educated and experienced in the costs, technology, and benefits of wind energy.** Most of the managers and staff are schooled and experienced only in fossil fuel and nuclear power generation. Public power board members generally follow the recommendations of management/staff in their policy decisions because they trust management and staffs' analysis, training, and experience. It is important that new board members are elected that seek training for their employees regarding wind energy technology, or direct the hiring of employees familiar with renewable energy technologies. Management also needs to be aware of the rural economic development advantages of partnering with private entities – such as farmer coops and communities to develop renewable energy generation. If these changes do not occur, Nebraska will remain stalled in wind energy development and will not realize its renewable energy potential."

- This respondent also wrote "In order to achieve further development of wind energy in Nebraska, wind energy supporters must be elected to the boards of the two largest public power districts – OPPD and NPPD. Changes must also be made to the make-up of the REA boards throughout the state. (The REAs have been the strongest opponents of net-metering legislation). Though state senators direct all state policy – including policy regarding public power – state senators defer to the policy positions of the public power districts because their boards are also elected. Given this deference to elected public power boards, changing the make-up of the boards is imperative in order to move Nebraska either towards development of more public power-owned wind energy generation and/or the public utilities partnering with private developers (particularly farmer-owned coops) to develop wind energy"

Possible Methods to Stimulate Wind Energy Development
(see pages 41 to 50 for pros and cons on each possible method)

* Have CBEDS /private entities continue to work with Public Power Districts and small energy distributors to make private wind energy generation in Nebraska work

* Pass legislation either restricting or clarifying public power districts and municipalities authority to condemn any private electrical generating facility located within their jurisdiction in order to stimulate wind energy production by private sector development and CBEDS.

* Encourage State Senators to continue to listen to the professional advice offered by public power districts, but to fulfill their role as the entity which makes the rules governing public power rather than deferring to the recommendations of the organizations they are supposed to be regulating.

* Encourage our Federal representatives to extend the Federal Production Tax Credit

* Encourage our Federal representatives to provide REPI credits on par with PTC in terms of long-term assurance and financial benefit

* Work with the unicameral to develop laws and policies that encourage commercial companies and CBEDS to develop wind farms and the supporting infrastructure (such as expanding the grid).

* Encourage an increase in the state's renewable energy tax credit to offset the disadvantages of REPI

* Encourage Public Utility Boards to train or hire staff with experience in renewables

* Encourage qualified supporters of renewables to run for seats on their Public Utility Boards

* Educate public power utilities on the in-direct benefits of renewables such as local economic benefits

* Work to unify efforts in promoting renewables

* Develop a new paradigm in this state geared toward exporting electricity

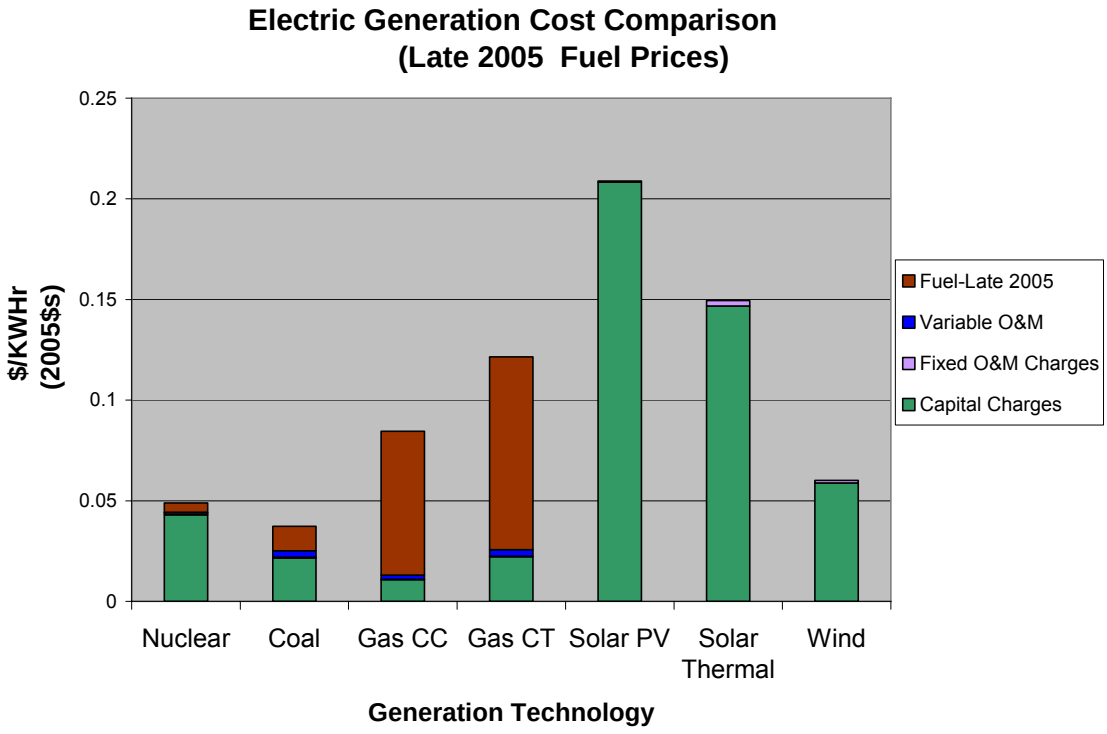
* Encourage legislation mandating new conventional energy investments be offset by a set percentage of renewables

All applications for new commercial electric power projects in the state of Nebraska must be brought before the Power Review Board (PRB). By Statute, **the PRB must choose from alternatives on the basis of least cost in conventional terms. There can be no allowance for non-monetized benefits or for hidden subsidies**. [17]

There is one exception to this rule in that **Nebraska law allows a utility to build up to a 10 MW renewable energy facility without meeting the least-cost criteria**. However, such projects must show some pubic benefit and be approved by the Nebraska Power Review Board.

Coal is the cheapest option today, will it be tomorrow?

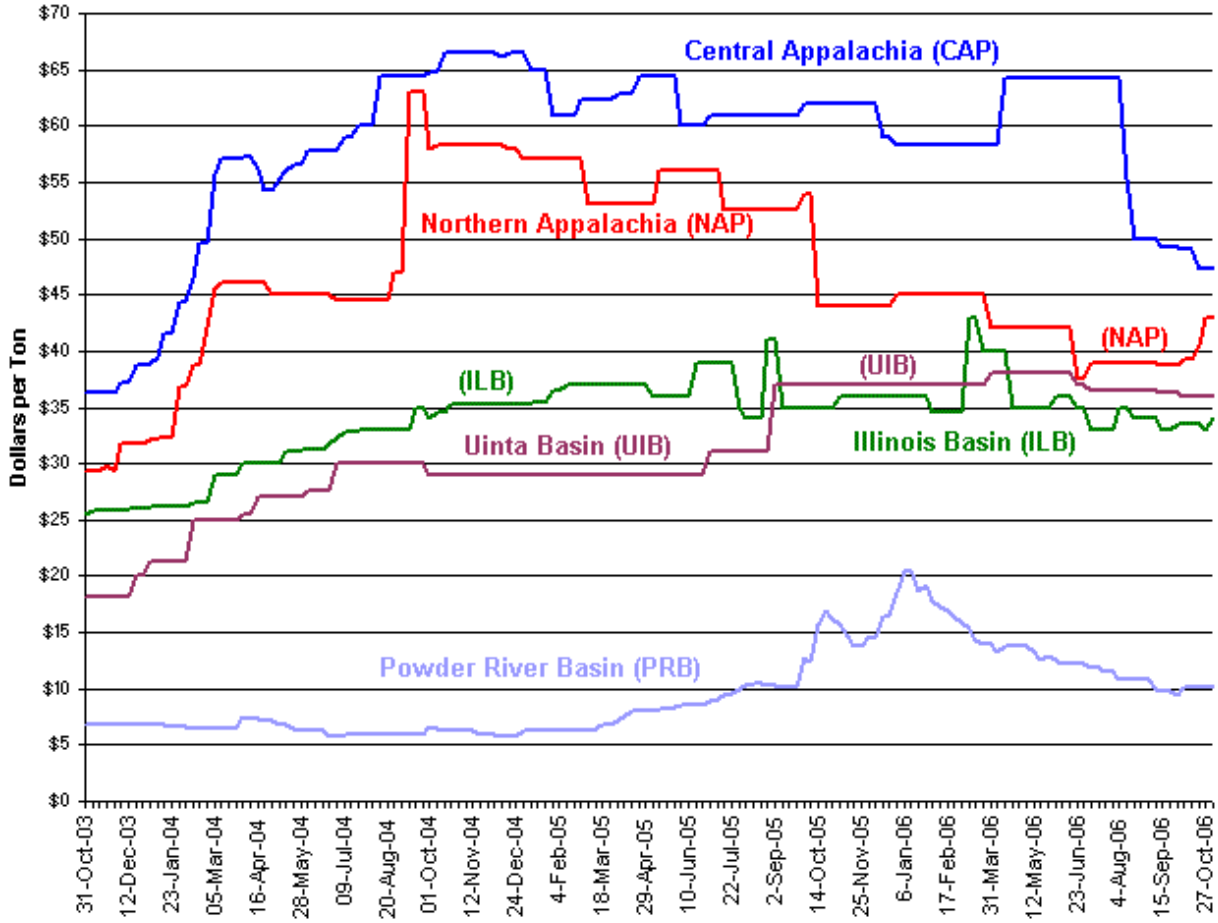
When operating under the state statutes of a least-cost option, coal fired-plants most often arise as the best choice. This is largely because Nebraska has the great fortune of being located near the hugely abundant and cheap Powder River coal fields in Wyoming. Whereas wind power development involves heavy investment of fixed capital costs up front, coal fired plants have a much higher proportion of variable costs with this variable cost obviously being very cheap coal. Without question our Nebraska public power utilities have been very good at generating cheap and reliable electric power using coal as the primary source of energy.



Source: J. Weyant, Stanford University

Although coal has continued to become cheaper and cheaper since the mid-1970's, this trend may have or may be coming to an end. Between January 2005 and January 2006, the overall cost of Powder River coal jumped almost 400% with a high point of $20.49 a ton. Fortunately a warm winter helped bring the cost of coal which has settled down to its present $10.15/ton range. However, this is still about double the price of just 18 month earlier.[18]

Average Weekly Coal Commodity Spot Prices
Business Week Ended November 5, 2006



Key to Coal Commodities by Region[1]

Central Appalachia:	Big Sandy/Kanawha 12,500 Btu, 1.2 lbSO2/mmBtu	Powder River Basin:	8,800 Btu, 0.8 lb SO2/mmBtu
Northern Appalachia:	Pittsburgh Seam 13,000 Btu, <3.0 lbSO2/mmBtu	Uinta Basin in Colo.:	11,700 Btu, 0.8 lb SO2/mmBtu
Illinois Basin:	11,800 Btu, 5.0 lb SO2/mmBtu		

eia Energy Information Administration
Official Energy Statistics from the U.S. Government

The prospect of coal settling back into the $5 range for a long period of time appears increasingly less likely due to a large increase in the demand for coal. Just this past winter, **the railroads began falling behind on their coal shipments.** This caused some utilities to sustain utility rate increases of $20 to $30 a month. [19] The November 28, 2006 Omaha World Herald indicates NPPD is increasing their 2007 electricity rates primarily due to an increase in the price of coal.[20]

Although the railroads are investing billions of dollars to expand their delivery capacity for coal,[21] it remains to be seen whether the railroads can keep up with the growing demand for coal and overall rail capacity.

The greatest pressures for the increased demand for coal are coming primarily from increased petroleum costs, increased natural gas costs, development of ethanol plants, and the general increase in demand for electricity. The higher cost of petroleum/gasoline has resulted in container shipments surpassing coal in rail shipments, [22] high natural gas prices are causing more utilities to turn to cheaper coal, [23] most of the new ethanol plants that are planned to come on line in the near future will be powered by coal**,** [24] and the general growing demand for electricity is largely powered with coal.[25]

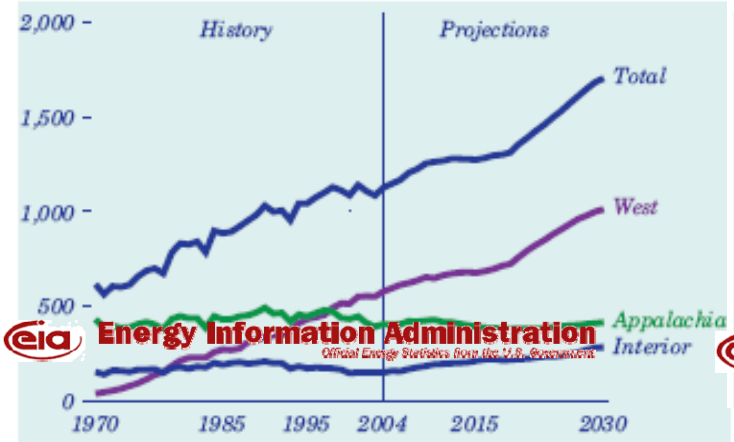
Furthermore, a **significantly increasing proportion of coal supplied from the US will come from the Powder River** fields because the eastern fields are in decline and PR coal has less sulfur. Not only does this mean more energy will come from Powder River coal, since PR coal contains less BTUs per ton, more tons of coal will be needed to make up the shortfall in energy content.[26]

The impact of global warming could also have an impact on raising the cost of coal. According to the September 14, 2006 Omaha World Herald, **NPPD has been advised that future federal regulations on global warming gases could raise the cost of using coal within the next five to ten years**.

The article stated that although noone knows what such regulations might look like, a reasonable starting point **might increase NPPD's current coal-generation costs by 33% to 40%**.[27]

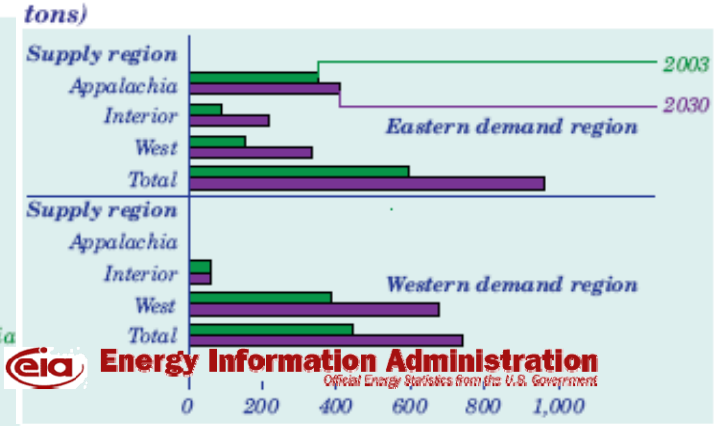
Market Share of Western Coal Continues To Increase

Figure 97. Coal production by region, 1970-2030 (million short tons)



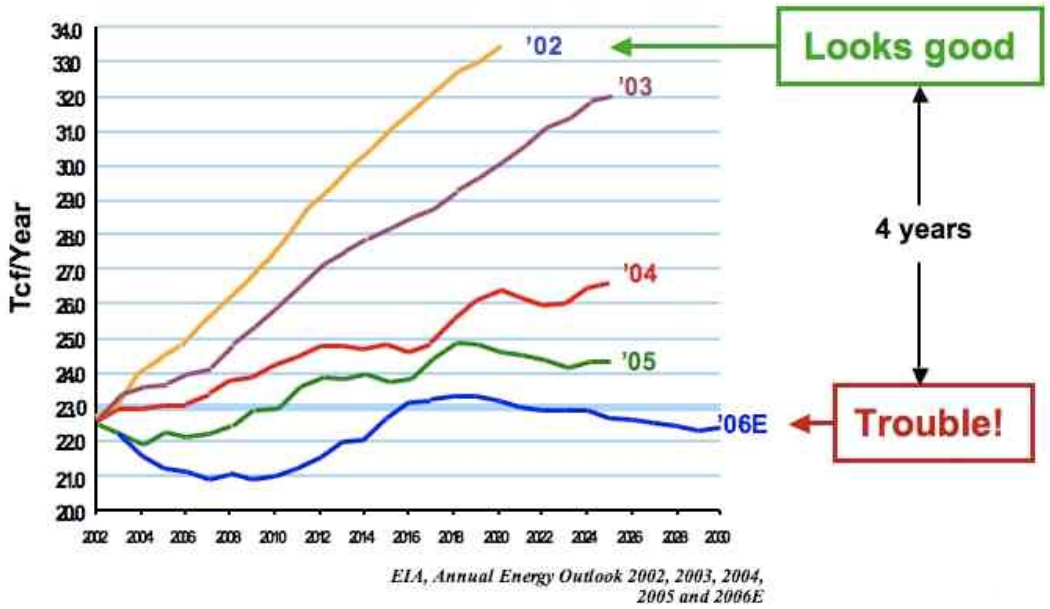
More Eastern Power Plants Are Expected To Use Western Coal

Figure 98. Distribution of domestic coal by demand and supply region, 2003 and 2030 (million short tons)



The sub-heading to this section is "Coal is the cheapest option today, will it be tomorrow?" While some may scoff at this heading despite what has been written in the previous paragraphs, a short history lesson on natural gas demonstrates this is a legitimate question**. As recently as a few years ago, natural gas was billed as the environmentally friendly solution to cheap electricity**. Natural gas plants for electricity production were constructed all over the country because of its perceived advantages. **Now, natural gas is an expensive alternative to producing electricity that has also been shown to drive up the cost to heat homes and factories in the winter.**[28]

DOE EIA Forecasts of N. American Natural Gas Supply to U.S.



EIA, Annual Energy Outlook 2002, 2003, 2004, 2005 and 2006E

Thus while coal-fired plants can be demonstrated to be the least cost option today, **due to its variable cost nature, there is no guarantee it will be the least cost option in future years.** While coal provided fairly consistent cost projections in the past, there are indications that we may be moving into a period where coal prices follow a more volatile and less predictable pattern.

Wind-powered energy, on the other had, **provides a consistent and highly predictable cost projection** for 20 years or longer since most of its costs are up-front, fixed costs. Wind power can thus be used as a hedge against future fuel cost inflation. If the cost of wholesale power from conventional sources increases and the cost of wind energy continues to come down, wind energy may fare even better from a "least cost" perspective on a short-term basis.

The shortfall of wind along the lines of this discussion is that **while it has an important place in the resource mix, until its energy can be efficiently stored wind can not be a substitute for base-load generation**. For now, the base load needs to be generated by coal, natural gas or nuclear, for the most part.

Another significant factor against wind energy, when just looking at cost, is that **Nebraska's electric rates are some of the lowest in the nation due to access to cheap coal. Thus there is very little incentive, from a price perspective, to integrate other forms of energy generation even if they are competitive in price**. This factor obviously makes wind energy less competitive in Nebraska, and therefore less attractive to both investors and Nebraska public power entities.

Environmental Impacts of the least cost option

While it is difficult to make a case for wind-energy when only looking at today's least cost option, **when the analysis takes a broader perspective and examines indirect costs, implicit costs, and negative externalities, suddenly other sources of energy such as wind and nuclear become more appealing.**

An environmental issue that is very relevant to our semi-arid region is **that coal uses a lot of water in the process of making electricity**. To generate the same amount of electricity as a single 1-MW wind turbine using either fossil fuels or nuclear power requires, on average, withdrawing roughly 60 million gallons of water a year from streams or rivers, of which nearly 1 million gallons is lost to evaporation.[29]

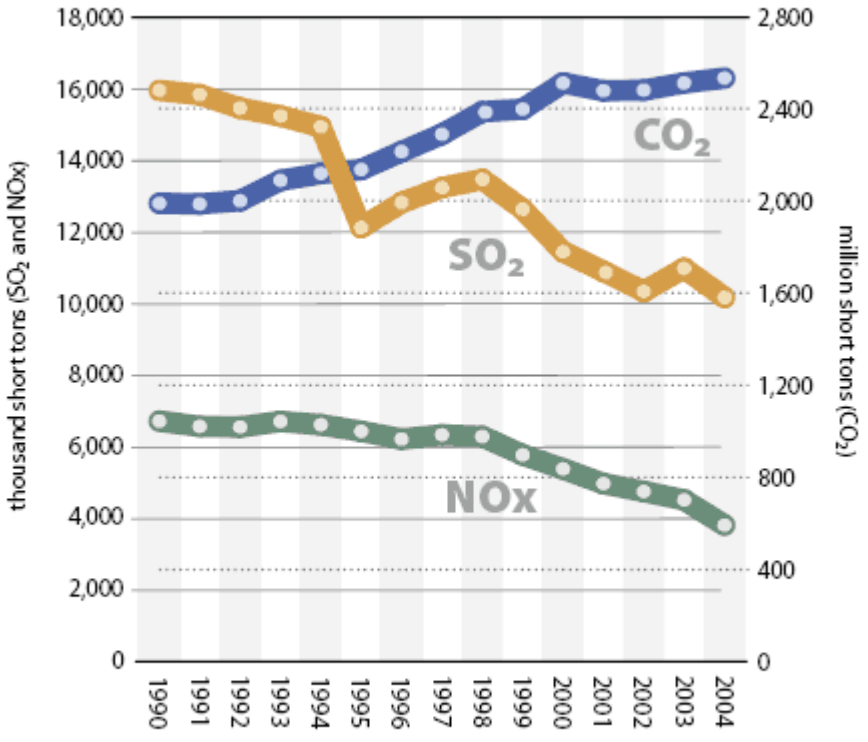
Even more significant are the **air pollutants produced by coal-fired plants**. A recent report evaluating air pollution trends at the nation's 100 largest electric power producers shows that while emissions of sulfur dioxide (SO2) and nitrogen oxides (NOx) have fallen markedly in recent years, **carbon dioxide (CO2) emissions increased and will likely spike in coming years**.[30]

The report, which focused on companies generating 88 percent of the nation's electricity, found that overall emissions of SO2 and NOx fell by 44 percent and 36 percent, respectively, between 1990 and 2004. The drops are largely the result of stricter pollution-control standards enacted in the 1990 Clean Air Act amendments. [31]

Conversely, CO2 emissions rose 27 percent in the same 14-year period, and the report predicts a bigger increase in the years ahead due to an unprecedented surge of new U.S. coal-plant proposals that would emit substantially more CO2 than other sources generating the same amount of power. There are currently more than 130 new coal plants proposed across the U.S., and Energy Information Administration (EIA) projects a 66 percent increase in coal-based power production and a 43 percent increase in CO2 emissions by 2030. The EIA projection assumes no controls on CO2 emissions at the power plants.[32]

FIGURE 6

SO_2, NOx and CO_2 Emissions from Electric Industry, 1990 - 2004



SOURCES: EPA, 2002 NATIONAL EMISSIONS INVENTORY, *AIR EMISSIONS TRENDS 2005*; EIA, *EMISSIONS OF GREENHOUSE GASES IN THE UNITED STATES 2004*

The impact of these pollutants goes beyond the very real dangers associated with global warming. Coal fired plants are a major contributor to significant environmental and health problems including acid rain, acidification to bodies of water, regional haze and ground-level ozone which is a lung and asthma irritant.[33&34] In addition, mercury released from coal is a neurotoxin that can collect in tissues of fish and is especially dangerous to pregnant women.[35]

There are potential ways to significantly reduce emissions from coal. However, they are costly. The coal industry likes to promote that it is the cheapest source of electricity generation and that technology exists to potentially eliminate emissions.[36] While these facts are correct when presented individually, taken together, the coal industry can not, in the present or near future, simultaneously be the cheapest source of electrical generation and be a zero-emission industry. [37]

Since coal fired plants have the highest carbon dioxide production rates of any electric power plant, it is **very possible that carbon emissions could be curtailed or penalized by public policy to combat global warming**. [38] This possibility is more and more likely as many U.S. states and regions move to enact their own limits on CO2 emissions from power plants. The U.S. government has opted for voluntary controls on carbon dioxide, but last year the U.S. Senate adopted a resolution calling for mandatory emission limits.[39] **Thus zero emission generators such as wind or nuclear helps provide important certainty or minimization against possible future regulatory action on carbon dioxide or any other emissions.**

That being said, while commitments to reduce greenhouse-gas emissions has propelled wind development in Europe, California, and the American Northeast, the **chances of Nebraska implementing such measures prior to Federal mandate is unlikely**. As one respondent stated "…..Nebraska ….is not populated by as many environmentalist type as areas in Colorado and other mountain states, who request and promote wind (or any form of renewable energy) and are able and willing to pay the premium price for it - wind is more expensive than grid power unless it is subsidized by tax credits."

Nevertheless, by finding ways to reduce coal emissions, there is an **enormous benefit to society through providing a cleaner environment and reducing health risks and cost to go along with fuel diversity, price assurance, economic benefits and energy.**

Photo from: www.mercola.com

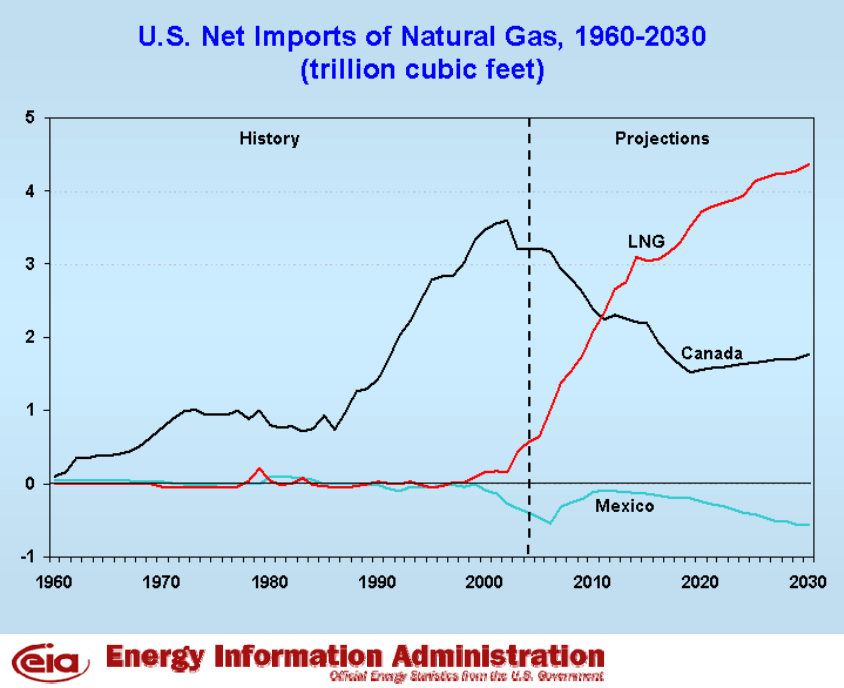
Economic Impacts of the least cost-option

Incorporating wind into the energy mix helps create jobs in rural communities as well as income for rural landowners. Rural landowners can receive lease rates of $2,000 to $10,000 per year for each wind turbine. [40]

A more blunt way of expressing the economic benefits of locally generated wind energy is that **every time you write a check for your electricity bill, you are basically helping Wyoming residents keep their taxes lower. Most Nebraskans, it is assumed, would rather have at least some of this money go to local taxpayers who are more likely to re-circulate those dollars in the local economy.**

Incorporating wind into the energy mix can help in reducing consumers overall energy bills. **Large scale wind deployment puts downward pressure on the price of natural gas.** [41]

Since natural gas is the most efficient source of instant heat for homes and businesses it is important to reduce the amount of natural gas used to generate electricity.[42] This point is even more relevant when one consider the IEA projections that indicate natural gas supplies in North America are in decline.[43]



The development of **wind energy can also create high paying jobs in manufacturing, installing, operating, and maintaining wind turbines**.[44] This is very significant when considering worldwide, the **wind and solar industries are likely to be one of the biggest sources of new manufacturing jobs in the next century**.[45] The added bonus to this is that such industries are very likely to locate in rural areas. However, **to have a realistic chance of attracting wind manufacturing or assembly to Nebraska, wind developers need an environment that is conducive to wind energy generation.**

Choosing Priorities

As far as weighing environmental and economic development issues against cheap energy issues, it simply comes down to choosing priorities.

If the state's priority is to retain its present system of cheap coal-fired energy without regard to the environmental consequences or its economic development short-comings, it will definitely be the easiest path to take. However, there is no guarantee this past paradigm of electricity generation will be as cheap in the future.

If the state wishes to place a higher priority on helping the environment and local economic development, the path will be somewhat more difficult to implement at the outset and may even result in slightly higher energy bills in the short run. However, it will provide added social and economic development benefits and may even save consumers money in the long run.

As one survey respondent wrote: "It is now seen as inevitable that all energy prices will continue to rise and that carbon taxes and carbon offset financial mechanisms will become national policy within a fairly short time frame. The more Nebraska can begin to reduce the adverse economic impacts of all of these by diversifying its energy resources, and capitalizing on its extraordinary renewable energy base, the more positive and stronger will be the state's economic future. The longer the state waits to start making these changes, the more it will reduce its economic competitiveness in the future."

Possible Methods to Stimulate Wind Energy Development:
(see pages 41 to 50 for pros and cons on each possible method)

* Generalize the least-cost statute to allow consideration of the non-monetized benefits of clean renewable

* If least cost statute not generalized, provide an expense allowance for renewable energy

* Increase the least-cost renewable exemption for renewable energy facilities (presently 10mw)

* Change statute to exempt non-emission generators of electricity to not have to comply with the least cost alternatives

* Educate the public including about how the benefits of regional renewable energy development can bring to their local economies

* Landowners who would like to capitalize on the economic benefits that will accrue to them from wind energy development should band together and form a voice that is heard in City Council and State Legislative chambers.

The **lack of incentives for the production of wind generated energy may be the single-greatest reason why Nebraska is not generating wind energy at the same level as most of its neighbors.**

While the policies of other states have propelled the wind energy industry forward, the Nebraska state government has not promoted, stressed, or funded wind energy as much as most of our neighbors. Although the Unicameral did pass a modest state level incentive for renewable generation this past year, it is the only state incentive and falls far short of many other states in the region.

An excellent website to examine and compare state incentives is available at: www.dsireusa.org/ The "Database of State Incentives for Renewable Energy" (DSIRE) is a comprehensive source of information on state, local, utility, and selected federal incentives that promote renewable energy.

Comparing the level of state wind energy incentives to the amount of wind energy installed shows that there is a close correlation between these two factors.

Even in Nebraska, the two largest wind projects were greatly assisted with incentives, albeit, they came from the Federal level. MEAN received a Renewable Energy Production Incentive (REPI) for their 10.5 megawatt wind farm constructed near Kimball while NPPD received the credit for the 60 megawatt wind farm constructed near Ainsworth.

However, as discussed earlier, most of the wind energy development incentives at the federal level do not provide public power equivalent incentives as they do for the private sector. In particular, the Production Tax Credit for the private sector is a far superior incentive than REPI, the public sector equivalent. According to an October 9, 2006 press release by NMPP Energy, the REPI amount awarded to the MEAN Kimball Wind Project was cut more than half from last year due to an increased number of eligible projects.

Furthermore, **even with Federal incentives such as the PTC, Nebraska will not be as attractive to wind developers as other states with greater incentives.** Another danger of solely relying on federal subsidies, is that the **PTC has realized an "on-again, off-again" status. This has hobbled project development and the industry as a whole**. Uncertainty also affects relationships with vendors and substantially increases costs as orders are rushed to meet PTC deadlines or as planning grinds to a halt and income is lost while the industry awaits an extension. (The PTC has been extended to the end of 2008.)

Unless there is a further extension of these tax credits, wind farm development may see yet another boom and bust cycle as it has in the past.

In surrounding states the **Production Tax Credit (PTC) and state imposed renewable energy mandates appear to be the two greatest stimulants.** A Renewable Portfolio Standard (RPS) is a policy that either requires or sets as a goal to have electric providers deliver a certain percentage of renewable power by a set date. RPS policies typically involve a credit trading mechanism so that companies with extra renewable power can sell the extra "credits" to suppliers who haven't met their RPS requirement. Electric suppliers who don't meet their renewable energy requirements often must pay a penalty fee, which sometimes goes into a clean energy fund to promote renewable energy development.

Presently 20 states have Renewable Portfolio Standards. **Typically, where there are RPSs and good wind resources you see more development both in terms of wind system installations and wind manufacturing plants.**

The **Nebraska Public Power District has set a voluntary RPS of 5%** with no deadline for its system while **most of the power districts in Nebraska have not set a voluntary RPS**.

By contrast, Colorado has an RPS of 10% by 2015 and Montana has an RPS of 15% by 2015. Texas, one of the fastest growing states for wind power, has recently put into law a bill that not only increases their RPS goal (5,880 MW by 2015) but also **provides mechanisms to enable utilities to realize this goal including the "competitive renewable energy zones"** that are discussed elsewhere in this report.

It should be noted, though, that **since Renewable Portfolio Standards are mandating a certain type of energy rather than letting the market determine the best alternative, there may be a higher cost of electricity due to such mandates**. **However, a counter-argument supporting a RPS is that such effort is merely off-setting negative economic and social externalities caused by the free-market.**

While **implementing a Renewable Portfolio Standard would likely greatly stimulate wind energy in Nebraska, survey respondents indicate this may likely face great opposition if it is mandated**.

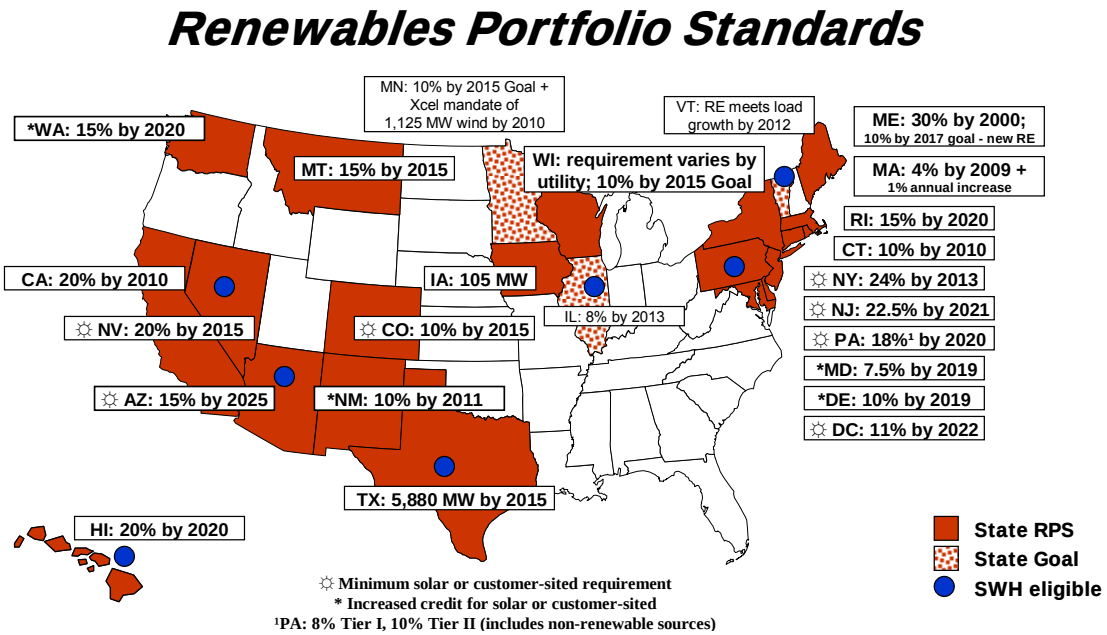
If the state fails to act, it is also possible that within the current contract framework, cities could still create a requirement by ordinance that all new electricity demand growth be met by renewable energy while the contracts continue to provide for existing electricity. Likewise, large companies can implement their own "RPS," although it is more difficult for individual companies to do such without net metering benefits (discussed later).

Another incentive that has enormous potential is a sales tax exemption for wind turbines and the related ancillary equipment, just like farm equipment. **Since wind is a very capital intensive investment, a sales tax exemption can reduce the costs of a wind project by as much as 5%**.[46]

Other incentives include a state funded **"Renewable Energy Funds" that are often financed by a Systems Benefit Charge, an increment to one's electric bill. These funds help provide capital for wind energy investments.**

Nebraska could also greatly benefit from selling Renewable Energy Certificates or Green Tags to areas of the country who wish to use more renewable energy yet lack the capacity to produce it a the desired level.

DSIRE: www.dsireusa.org November 2006



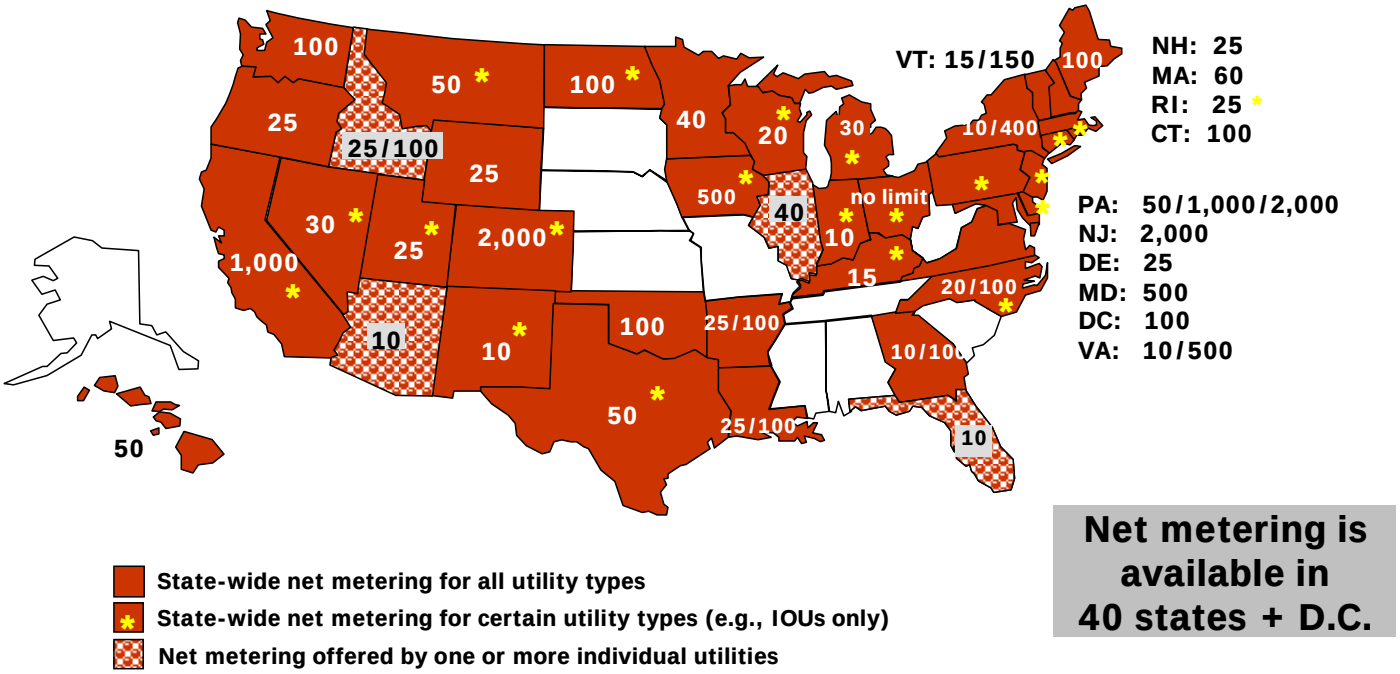
Net Metering

Another **incentive that can greatly stimulate small-level wind projects is net metering**, a state level policy which allows consumers to receive retail credit for some or all renewable energy produced by the consumer. The best arrangements for net metering allow the existing electricity meter to spin backwards to bank excess electricity production for future use or credit. In most cases, the primary goal here is not to sell electricity to the utility at what is typically a lower than the cost of production rate but rather to displace the retail cost of energy for the customer

Nebraska does not have a statewide policy on net metering. Each utility tends to come up with their own rules and some of these have been very economically unfavorable to the customer-producer. Typically, net-metering in Nebraska is limited to avoided costs. Contrarily, **forty states presently have some form of net-metering**

www.dsireusa.org September 2006

Net Metering Rules



Net metering is available in 40 states + D.C.

State-wide net metering for all utility types

* State-wide net metering for certain utility types (e.g., IOUs only)

Net metering offered by one or more individual utilities

#s indicate system size limit (kW); in some cases limits are different for residential and commercial as shown

The Federal Public Utility Regulatory Policies Act of 1978 (PURPA) creates net-metering to some effect by requiring electric suppliers to allow any renewable energy generator with a facility generating under 80 megawatts to feed into the distributive energy system. However, **electric suppliers are only required to pay avoided cost for any power fed back to the local distribution system by a customer-generator to the grid**. (In September of 2004 the Nebraska Attorney General issued another opinion (04024) which concluded that public power is subject to the provisions of PURPA.)

Net metering provides a variety of benefits for both utilities and consumers. **Utilities benefit by avoiding the administrative and accounting costs** of metering and purchasing the small amounts of excess electricity produced by small-scale wind energy facilities. **Consumers benefit by getting greater value for some of the electricity they generate and by being able to interconnect with the utility using their existing meter**. The only cost associated with net metering is indirect: the customer is buying less electricity from the utility, which means the utility is collecting less revenue from the customer. That's because any excess electricity that would have been sold to the utility at the wholesale or 'avoided cost' price is instead being used to offset electricity the customer would have purchased at the retail price.[47]

Net-metering can also provide benefits to businesses. Companies using net metering can combine these benefits with a long-term fixed cost of electricity, accelerated depreciation benefits and commercial investment tax credits.

Survey respondents indicate that net metering legislation would likely receive opposition. **Net-metering legislation has been introduced 4 times, however, none of the bills have made it out of Committee** as each time the Nebraska Power Association has opposed it. Furthermore, a bill was introduced on behalf of the REA which would have required only the avoided cost to be paid to the customer-generator for any energy fed back into the distribution system. It also included provisions which would have imposed any additional costs on the customer-generator such as the cost of new transmission lines.

It should be noted that **since small-scale wind farms do not enjoy the economies of scale advantages of commercial scale wind farms, net-metering alone will not likely be a significant level of renewable energy production** until either the efficiency of small-scale wind turbines is improved or electric rates increase tremendously. Nonetheless, net metering does provide incentives for individuals and companies to become more energy efficient. It also simplifies the use of renewable energy by allowing users to use their existing meter rather than having to invest in a second meter. Net-metering would also tilt the benefits of small-scale wind generation from the utilities to the public in our Public Power state.

Possible Methods to Stimulate Wind Energy Development:
(see pages 41 to 50 for pros and cons on each possible method)

* Pass legislation that enacts a Renewable Portfolio Standard (The legislature should work with the public power utilities to ensure that they will not be saddled with unrealistic mandates)

* Allow a sales tax exemption for wind turbines and the related ancillary equipment

* Enact net-metering laws that provide consumers retail-rate benefits up to their level of personal consumption.

* Develop a Renewable Energy Fund financed by a Systems Benefit Charge to provide capital for utility-scale wind energy investments.

* Increase and expand the renewable energy credit

* Develop a state program to sell green tags

* Start an Anemometer loan program to reduce cost of wind testing.

* Create a Wind Energy Board modeled after the state's Ethanol Board

"It is unfortunate when folks think the power company should just put up a wind generator on top of that high hill there, where the wind is always blowing, and do not even consider it would take six miles of transmission line to get it to the distribution grid - assuming that the line is not already being used to capacity - which nowadays it well could be. This is just one of many issues that wind proponents need to be made aware of, to keep proposed projects in the present real world."

This survey response illustrates one of the greatest challenges, and frustrations, in developing the wind industry in Nebraska. While Nebraska certainly has adequate wind resources to foster a strong wind power industry, a **significant impediment seems to be regional transmission availability and capacity**. Either the existing lines are fully utilized, or the existing lines that can handle higher loads tend to be located at some distance from the best wind sites which tend to be in remote areas of the state.

These transmission issues are not limited to Nebraska, there are transmission constraints throughout the Great Plains. The overall grid system does not have the capacity where needed to transport wind energy directly from the remote areas of the plains to the large cities like Denver, Minneapolis, Kansas City, etc. This is especially true in Nebraska where transmission lines tend to distribute electricity to Nebraska customers rather than transporting electricity to markets such as Denver.

Building new transmission lines to support the power from wind is very costly to build and often can make a project cost-prohibitive. For example, to expand the MEAN Wind Project at Kimball, MEAN must spend at least $2-3 million to expand the electrical transformers in order to access the transmission grid. Additional costs for potential transmission improvements to connect the wind farm with the expanded transformers must be paid by MEAN. These transmission improvement costs are on top of the costs for local site infrastructure and turbine installation. These costs and operational constraints make the resource less attractive to meet the policy of least-cost resource required by state regulations.

As stated by the AWEA, "**A critical issue in keeping costs down in building a wind farm is minimizing the amount of transmission infrastructure that has to be installed. High voltage lines can cost thousands of dollars per mile. Whenever possible, availability and access to existing lines should be considered in selecting a site**." (Note: transmission lines can cost hundreds of thousands of dollars per mile)

Also, **while wind project developments happen in 1 to 2 years, a transmission expansion project typically works on a longer time cycle**, so the **transmission problem usually needs to be solved in advance of the wind development.**

Other issues that were discussed by survey respondents included a wind developers ability to tie into the grid and receive a fair Kw price for delivered energy. As one respondent stated, "We have amazing wind potential but a selling price of$.019 per Kw doesn't work."

Obviously these transmission issues are not limited to Nebraska. Other states such as Wyoming, Colorado, Kansas, Iowa, South Dakota and Minnesota have apparently overcome these issues, at least to some extent.

Texas is attempting to overcome this issue by implementing something called "competitive renewable energy zones." These zones are areas that are identified as likely areas for renewable energy development, mostly wind, that will require extra power line capacity to be able to export that electricity potential. Since it takes much longer to put in power lines than to install wind farms, **the folks in Texas are trying to get ahead of that curve so as to not stifle wind energy development in the longer run.**

In identifying these CREZ areas, Texas' Public Utility Commission considers the renewable energy potential, cost of transmission, level of financial commitments from energy developers and input from the Texas Parks and Wildlife Department.[48]

Another innovation from **Texas is they spread out the cost of new transmission lines by accounting them as part of the overall transmission network rather than as a direct charge to the wind project.** [49]

Several state utilities commissions in Nebraska are considering policy changes that will encourage investment in new transmission that supports wind energy. As one person wrote, "To do all this the *right way*, it will require some policy changes and some pretty burdensome upfront costs."

There are also efforts by the American Wind Energy Association (AWEA) to work through the Western Governor's Association to come up with some regional transmission development policies that would allow for increased wind energy development.

One survey respondent commented that "There has been some discussion of so-called "supergrids" to connect various wind farms together over wide areas. Airtricity has proposed such a system in Europe and I've heard that there have been some discussions of such developments in the USA .."

Possible Methods to Stimulate Wind Energy Development:
(see pages 41 to 50 for pros and cons on each possible method)

* Seek state and federal assistance to fund transmission lines in Nebraska and the Great Plains

* Implement the Texas model of "competitive renewable energy zones"

* Work with the DOE to work on distribution issues.

* Allocate transmission costs for new wind plants over the entire transmission network in the state. (Texas uses this provision).

* When larger markets such as Denver witness a major blackout, use it to promote the development of transmission in the US.

* Expand the electric grid over a multi-state region

* Develop system of Supergrids

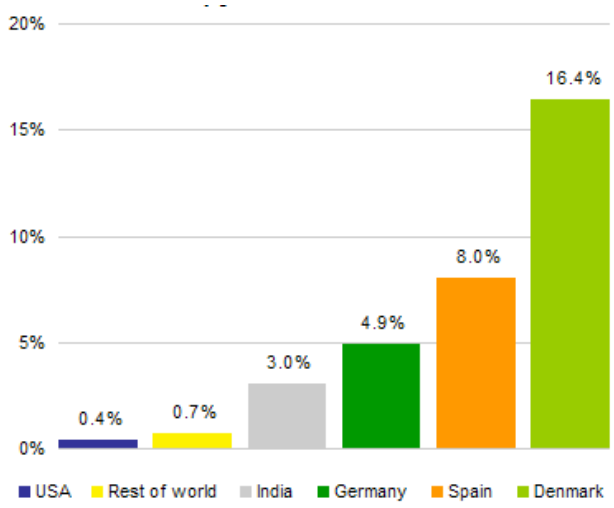
Reliability concerns regarding wind power has been one of its biggest shortcomings due to winds variable nature. **While variability concerns are often greatly exaggerated, they do hold some merit. Even though the cost of wind generation has come down, because of its intermittent availability it cannot serve as a dependable source of base-load generation. Backup sources have to be available when the wind doesn't blow, increasing the overall cost of power**.

One survey respondent commented: "My wish would be that more effort be made to educate that there is a lot more to wind energy than just finding a windy spot and plopping up a wind turbine. This would be a very good and easy thing if the public were willing to do without electricity when the wind wasn't blowing, or put up with varying voltages and frequencies, but I suspect that these would not be acceptable complications."

While it is true that wind power output varies over time, **utilities have learned to integrate wind power with their existing electricity generators**. **A study by PacfiCorp found that concerns about wind's value being eroded due to increases in overall system operating costs are unfounded, although they do increase costs somewhat.[50] GE Energy, GE consulting, has found that at a 10% generation level, the loss of wind not a credible concern, system stability was enhanced by wind** [51]

In fact, **16.4% of Denmark's electricity is generated by wind power,[52] yet Danish utilities report no loss of reliability and no need for expensive new equipment or energy storage** [53] Denmark is able to produce this high level of output because their grid is connected to the Norwegian, Swedish and German grids. The inter connectors were built as export lines of Norwegian and Swedish hydroelectric power to Germany but have found a new use in helping to balance the variable wind output from Denmark.[54]

Share of Total Electricity Generation from Wind



Source: BP Statistical Review, 2006

In America, the reason such high volumes of wind could be incorporated into an electrical distribution system is because most regions of the US are served by "power pools" of utilities that join together to jointly generate electricity and transmit it where needed. Electricity coming from many different types of sources flows into a pool from which it is distributed. A power pool can easily absorb the electricity from a wind plant and add it to all the rest.[55]

There is no need to back up every megawatt of wind energy with a megawatt of fossil fuel or other dispatchable power. The electric grid is designed to have more generation sources than are needed at any one time because no power plant is 100% reliable. It is a complicated system designed to absorb many impacts, from electric generation sources going out of service unexpectedly to industrial customers starting up energy intensive equipment. The grid operator matches electricity generation to electricity use, and wind energy's variability is just one more variable in the mix. [56]

One of the most authoritative studies, conducted in 2004 for the Minnesota Department of Commerce **found that adding 1,500 megawatts** (MW) of wind energy (enough wind to meet the needs of more than 400,000 homes) to the system of a major utility, Xcel Energy in Minnesota, would **require only an additional 8 MW of conventional generation to deal with added variability.** [57]

Many sources of electricity considered highly reliable suffer from unexpected outages: for instance nuclear reactors and coal plants that shut down, often at short notice, for safety repairs or maintenance. Yet no one proposes to back up a coal or nuclear power plant with a similar amount of dedicated generation from another plant. **The reality is that wind energy is naturally variable, but not unreliable**. Wind farms are built in windy areas, and seasonal and daily wind generation patterns can be anticipated. And in contrast to conventional power plants, wind farms need not shut down altogether for maintenance and repairs—a turbine fault, when it occurs, can be repaired while the other turbines continue to operate.[58]

Small Scale Problems

Obviously, the more comprehensive and extensive the power grid and power pool and the more widespread the turbine locations, the easier it is for a distribution system to absorb high levels of wind energy. Conversely, it is **much more difficult for a smaller system to absorb high levels of wind energy particularly if it is depending on a single site for its wind generation**..

As one survey respondent wrote "Our utility has an all requirements contract with ****, and are limited to purchasing power from any type of distributed generation in excess of 25 kW. We are not against wind generation if it makes sense. The major problem from the utility's perspective with wind farms is that there is no guarantee that the wind will be generating power at the time in which the consumer needs to use it, therefore creating a need to have some additional source of power when the wind is not blowing. This creates an additional means of generating. If a wind farm can be operated in concert with say a hydro generation plant that does not require a fossil fuel wind generation makes perfect sense."

Some of the smaller utilities also do not have the experience to manage a variable supply source. One survey stated "I have visited with many of the public utilities and they say the other factor is the wind does not always blow when you need the power and they don't think they can manage the power grid with spikes and valleys in generation."

Even though the wind can be accurately predicted hours in advance thanks to modern day weather forecasting advancements, even next day **wind speed forecasts can be unreliable**. **This adds difficulty and costs to the job of maintaining instantaneous balance between total system generation and total system consumption, for smaller systems**.[59] **A significant problem with this reality is that transmission providers assess significant penalties when energy is scheduled from the wind farm but not produced due to lack of wind.** MEAN's wind resources output might range from 1 MW to 17.5 MW with no notice and little ability to adjust other generation units instantaneously to "swing" with these constant fluctuations. Currently, there is no cost effective ability to store electricity; the instantaneous load on the system must be served by the resources that are on line at that instant. (It should be noted that wind turbines have enough mechanical momentum to prevent an 'instantaneous' cut off of power)

Capacity Factor

One survey wrote "I think Nebraska needs to be careful with renewable wind energy with a capacity factor of 30 to 40 percent, if too much is installed it will end up costing the end use customer higher rates to pay for the investment." This illustrates a common misperception that the low capacity factor of wind turbines means they are usually not operating.

In reality, wind turbines generate electricity most (65-80%) of the time, although the output amount is variable. No power plant generates at 100% "nameplate capacity" 100% of the time. Nameplate capacity refers to the maximum generation potential of a power plant. A conventional power plant is occasionally closed for maintenance or repairs, or runs below full capacity to best match demand (which varies during the day). If properly placed, wind farms are built in areas where the wind blows most of the time, but because of variations in speed, a wind farm will generate power at full rated capacity about 10% of the time, and on average throughout the year the plant will generate 30% to 35% of its rated capacity.[60]

Timing of Wind

In Nebraska, the wind tends to blow more in the summer months than it does in winter.[61] This is unfortunate as winter wind is more valuable due to its ability to hold down natural gas prices. (One survey respondent refutes this, though, showing wind speeds reported at airports across the state show wind speeds in winter are higher in many parts of the state.)

Fortunately, the wind does still blow quite often during Nebraska winters. As **the Western Governors Association stated in a recent report.: "Wind energy is playing an increasingly important role in enhancing electric system stability and reliability. Wind can add great value by providing substantial production during winter nights when other utilities are challenged to keep gas deliveries balanced at reasonable cost for heating"**

Storing wind Power

Since wind is not dispatchable, it does not lend itself well to bolstering the reliability of a utility's portfolio. It may be difficult for some public power utilities to justify a wind generation facility of any significant size due to the cost and reliability factors.

However, all **this could change if wind energy could be efficiently stored**. As one survey respondent wrote: "**Wind energy will always be intermittent. If production from wind could be converted by electrolysis to hydrogen, that hydrogen could then be stored and take on the characteristics of firm power**, which is much more valuable than intermittent "non-firm"" energy. An electric utility would have a considerable cost advantage in transporting the energy (as electricity) over existing power lines to near the point of use."

A completely renewable baseload electricity generation system could also potentially be created by combining wind energy, compressed air energy storage, and biomass gasification. This system can eliminate problems associated with wind intermittency and provide a source of electrical energy functionally equivalent to a large fossil or nuclear power plant. Compressed air energy storage (CAES) can be economically deployed in the Midwestern US, an area with significant low-cost wind resources and is more suitable than pumped hydro storage due to lack of water resource.[62]

Members of the Iowa Association of Municipal Utilities have invested in a proposed power plant that would use wind turbines to drive compressed air into underground aquifers. The air would be released to generate electricity when needed.[63]

If Nebraska would use its University system to research wind energy storage, the value of wind energy could grow enormously. If a cost-efficient wind energy storage answer is found, not only would this be an enormous technological breakthrough, it would be even more relevant for Nebraska since wind blowing in the central part of a continent is less consistent than wind blowing off the ocean.

NPPD, OPPD, and the Lincoln Electric System have taken action in regard to energy research as they have **recently partnered with UNL to fund the Nebraska Center for Energy Sciences Research, demonstrating that they are taking steps to investigate and move toward more renewable power sources.** NPPD has agreed to finance the energy research center with $5 million over 5 years, and it is the plan of NPPD to provide a total of $2 million per year for clean, domestic energy research have also joined this partnership with the University. Also, in 2005, NPPD sponsored a bill that was approved in the Legislature to give public power the authority to engage in the production and distribution of hydrogen.

Possible Methods to Stimulate Wind Energy Development
(see pages 41 to 50 for pros and cons on each possible method)

* Secure additional funding for research into developing efficient storage for wind energy

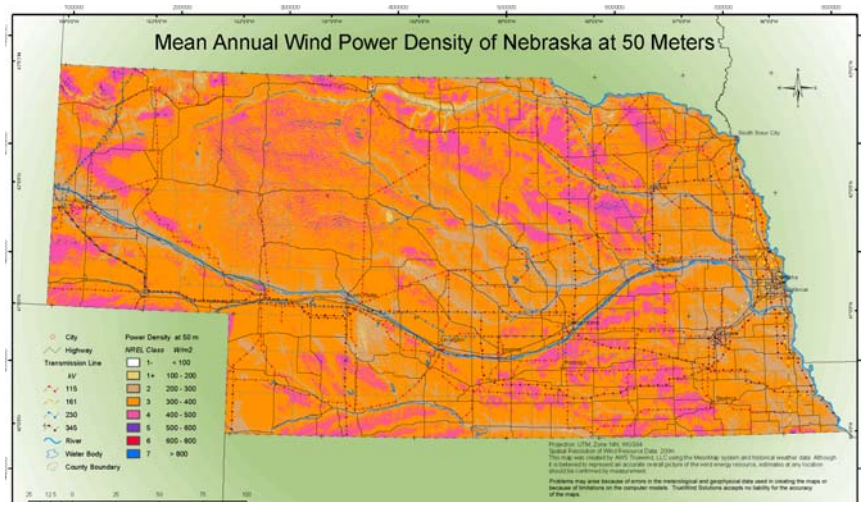
* Support studies and R&D to develop storage and generating options that can complement the intermittency of wind generation

* Educate consumers and public power providers that high volumes of wind, even up to 20%, can be feasibly integrated into a large electric distribution system or pool without disrupting reliability.

* Expand the size of the power grid to more easily incorporate wind variability.

* Expand the use of hydro-electricity to enable a firm backup to wind

* Evaluate the effectiveness of CAES systems



Wind power varies as a square of the rotor diameter and as a cube of wind speed. Finding a location that increases wind speed by 26% will increase wind power by 100% [64] Thus **finding a site with consistently high wind speeds can make the difference between a failed wind energy investment and a highly profitable investment.** Thus research into site locations is an important component into efficiently implementing wind power.

General wind assessments have been made for Nebraska including **one study that ranks Nebraska 6th in wind potential.**[65]

THE TOP TWENTY STATES for Wind Energy Potential

as measured by annual energy potential in the billions of kWh, factoring in environmental and land use exclusions for wind class of 3 and higher.

		B kWh/Yr			B kWh/Yr
1.	North Dakota	1,210	**11.**	**Colorado**	**481**
2.	Texas	1,190	12.	New Mexico	435
3.	**Kansas**	**1,070**	13.	Idaho	73
4.	**South Dakota**	**1,030**	14.	Michigan	65
5.	Montana	1,020	15.	New York	62
6.	**Nebraska**	**868**	16.	Illinois	61
7.	**Wyoming**	**747**	17.	California	59
8.	Oklahoma	725	18.	Wisconsin	58
9.	Minnesota	657	19.	Maine	56
10.	**Iowa**	**551**	**20.**	**Missouri**	**52**

Source: An Assessment of the Available Windy Land Area and Wind Energy Potential in the Contiguous United States, Pacific Northwest Laboratory, August 1991. PNL-7789

One survey respondent questioned this assessment stating " First - according to the U.S. DOE's National Renewable Energy Laboratory, their U.S. Wind Resource Map shows that the large majority of Nebraska is classified as "Fair" for wind resources. The map is based on a scale of 2-7 with 2 being poor wind, and 7 being classified as superb wind - as I said, most of Nebraska is a "3" which is fair. Two areas of our state are a 4 (Good) - north central and the extreme southwest corner of the panhandle around Kimball. There are 10 states with outstanding wind resources, and Alaska has a lot of areas classified as superb. According to this map, Nebraska has probably the 14th or 15th highest potential."

However, the U.S. Department of Energy's National Renewable Energy Laboratory's assessment of Nebraska actually states: "This map indicates that Nebraska has wind resources consistent with utility-scale production. Major areas of good wind resource are found throughout much of Nebraska except the extreme eastern fringe (such as Lincoln eastward to the Missouri River). Transmission lines either traverse or are located in close proximity to many of these good wind resource areas. Significant areas of excellent wind resource are imbedded within some of the good wind resource areas, such as the excellent areas located southwest of Norfolk, west of Valentine, west of Chadron, and south of Scottsbluff. The best wind resource areas are typically located on elevated terrain features, whereas the lowest wind resources are generally located in valleys and basins with relatively low elevations." [66]

While these generalized maps are good starting points showing the regions with the best wind potential, it is still important to have more reliable, site specific studies.

NPPD is taking a lead role in Nebraska by performing wind studies across the state. However, one survey respondent stated: "The program that I work for is called the ***** We have developed the largest publicly available wind resource database for the Great Plains region. States such has Minnesota and North Dakota have an abundant amount of wind resource data available to the public. It may seem surprising, but developers often seek data from us in order to correlate with the data they collect. Hence, I believe that states can assist and encourage wind development by providing for publicly available wind data. I would like to see the State of Nebraska fund a wind monitoring network for the state."

Another survey respondent advised: "Collect good data of the wind resources in the panhandle. This means a multi-year (minimum of 3 years, 5 years would be better; data needs to be up to a minimum of 100 meters) study of wind energy resources in the panhandle. This data needs to be an excellent quality and readily available for free. I suggest contracting with UNL to collect the data. UNL will be accepted as an honest broker. If a location has the economically viable wind resources, that location will sell itself."

Possible Methods to Stimulate Wind Energy Development:
(see pages 41 to 50 for pros and cons on each possible method)

* Provide a state-funded wind monitoring network for the state using an entity that will be accepted as an honest broker

* Enable wind site data that is easily accessible to the general public and private sector

* Develop an Anemometer Loan Program

Because wind energy is a capital intensive investment involving significant fixed costs as part of the original investment, the cost of financing a wind energy project constitutes a large variable in a wind energy project's economics

Large corporations such as BP, Shell, and GE Energy, for example, **have the ability to finance the largest wind farms which benefit from greater economies of scale, whereas smaller entities and public power utilities often have to implement smaller-scale wind farms that simply are not as economically viable.**

The **ability to finance and develop large wind farms is very important because a large wind farm is more economical than a small one**. Assuming the same average wind speed of 18 mph and identical wind turbine sizes, a 3–MW wind project delivers electricity at a cost of $0.059 per kWh and a 51-MW project delivers electricity at $0.036 per kWh—a drop in costs of $0.023, or nearly 40%. Any **project has transaction costs that can be spread over more kilowatt-hours with a larger project.** Similarly, a larger project has lower O&M (operations and maintenance) costs per kilowatt-hour because of the efficiencies of managing a larger wind farm.[67]

There are some financing mechanisms available to public power that may help them produce larger projects, albeit the overall levels of funding are limited. **The most recent Energy Bill made available Clean Renewable Energy Bonds for public power entities. This may help put public power incentives on a more equal footing with the tax incentives available to private developers** and may result in additional development in Nebraska.

There are potential funding mechanisms the state could initiate as well. Nebraska could start a utility bond fund to finance the process. Nebraska could also follow the example of other states and develop a Renewable Energy Fund financed by a Systems Benefit Charge to provide capital for utility-scale wind energy investments.

Another potential funding opportunity is Community-Based Energy Developments (C-BED). CBEDS have worked well in Minnesota and are basically local cooperatives focuses on local landowners and other local investors in becoming the owners and operators of wind farms, instead of having out-of-state wind farm developers doing most of the development and taking many of the economic benefits out of the state.

Before C-BED, **Minnesota had their own production tax credit to encourage the development of wind power in their state but this was removed, at a savings to taxpayers, by the implementation of the C-BED model.** The **economic benefits by shifting to a local economic development approach have been noted as being very significant verses the out-of-state developer based model**. As usual, locally owned business typically keep the cashflow in the community more than out-of-the-area owned business contributing to an economic multiplier effect.

Another financing opportunity that has proven to work well in some places but not in others is the development of buyers clubs. These clubs basically have consumers lock all or part of their electricity to green energy sources, usually at a higher, but fixed cost.

One survey respondent brought up another finance issue in that "Nebraska has been slow to develop wind energy because our needs are growing at a rate that energy sources already in place can keep up. Developing any new energy sources require large amounts of capital meaning it would need collaboration between industry, local and state government. Capital that most Nebraskans don't feel we have." This issue is very relevant, but relates back to the least-cost issue of establishing priorities of importance.

Possible Methods to Stimulate Wind Energy Development
(see pages 41 to 50 for pros and cons on each possible method)

* Develop a State Utility Bond Fund for Renewable Energy

* Create an environment that is conducive for wind energy investment for companies with the financial ability fund wind farms that are large enough to enjoy economy of scale benefits.

* Encourage our federal representatives to provide additional funding for Clean Renewable Energy Bonds and other mechanisms that assist public entities develop large scale wind farms

* Develop a Renewable Energy Fund financed by a Systems Benefit Charge to provide capital for utility-scale wind energy investments.

* Create an environment that is conducive to the development of Community-Based Energy Developments (C-BED).

* Develop Buyers Clubs modeled after successful programs like North Carolina GreenPower

While transmission accessibility and natural wind resources (discussed earlier) are the two most important placement issue for wind turbines, there are many other items that need to be considered such as avoiding air traffic conflicts, mitigating environmental impacts such as harming habitats or endangered species, creating conflicts with migrating birds, raptors and bats, local zoning issues, and even military radar.

In some instances, threatened or endangered species, and their associated laws, may limit wind installations. In other instances, **wind farms located in the path of bird migration routes or near the habitats of raptors or bats can cause death to these animals. All of these conflicts can be avoided if these high conflicts are identified and avoided**. This is a factor that should certainly be taken into account for Nebraska developments as our state has many migratory bird flyways.

The Ainsworth wind farm was able to effectively mitigate the endangered species issue on their site by using baiting techniques. Other areas have not been as fortunate. Bird kills by wind turbines have been quite high, comparatively, in the Altamont Pass area of California in particular.[68]

While zoning has traditionally been a local issue**, model ordinances for wind energy facilities can help avoid conflicts, reduce the uncertainty for developers and expedite the development of projects**. Pennsylvania, a very pro-active wind state, has developed such a model ordinance for their state. Issues of setbacks, noise, blade flicker, communications interference and other issues are all noted in this document.

An overall site verification program could help wind developments. The Springview site, for instance, was part of the DOE-EPRI Wind Turbine Verification Program.[69]

Possible Methods to Stimulate Wind Energy Development:
(see pages 41 to 50 for pros and cons on each possible method)

* Develop a state wind verification program that certifies potential wind generation locations are suitable for transmission, wind thresholds, wildlife, zoning, and, airports.

* Work with the Game and Parks Commission and Fish and Wildlife Service to identify areas where wind farms would conflict with wildlife habitats or migratory bird routes.

* Work with the Game and Parks Commission to mitigate the impact to birds, bats and other wildlife

* Establish model zoning ordinances to help facilitate wind energy development

"Never doubt that a small group of
thoughtful citizens can change the world.
Indeed, it is the only thing that ever has,"
-- Margaret Mead

Public Power/Private Development/State Law

*** Have CBEDS /private entities continue to work with Public Power Districts and small energy distributors to make private wind energy generation in Nebraska work**

Pros: Cooperative efforts between Public Power and private companies and/or CBEDS can provide win-win situations without state mandates. Private entities or CBEDS can provide the capital resources to develop larger and more efficient wind farms. Private entities and CBEDS or eligible for production tax credits that can make borderline projects highly feasible. Private entities or CBEDS can reduce the risk of wind energy development for public power. Private entities or CBEDS often can provide the expertise in wind energy development that many public power entities lack. They can also open up export markets that the public power districts may not be set up to serve. Public power also does not have to purchase wind generated power from private entities if they can not provide it in a cost effective package acceptable to the Public Power Districts.

Cons: Public Power has not only shown little interest in building such relationships, recent actions by a public power district may have soured private effort to develop wind energy proposals for public power districts..

*** Pass legislation either restricting or clarifying public power districts and municipalities authority to condemn any private electrical generating facility located within their jurisdiction to stimulate private sector development and CBEDS.**

Pros: Such legislation would provide assurance that the time, effort and money invested in a wind-energy facility could not be condemned by a public entity.

Cons: If the state repeals the statutes granting public power districts and municipalities the authority to condemn private electricity generating facilities, it may not necessarily restrict a public entity from condemning private property for a public benefit. If such a repeal was effective, it may have a negative impact on Nebraska's Public Power structure if large coal or nuclear power plants could not be condemned.

If amended statutes were somehow structured to exempt renewable energy from condemnation, it probably would have a minimal impact on the state's public power structure. However, legal questions would need to be answered regarding the legality of discriminating certain types of electrical generation. It would also still need to address a public entity's ability to condemn private property for a public benefit

*** Encourage State Senators to continue to listen to the professional advise offered by public power districts, but to fulfill their role as the entity which makes the rules governing public power rather than deferring to the recommendations of the organizations they are supposed to be regulating.**

Pros: Providing proper governance over public power helps ensure Nebraska's citizens remain the top priority in maintaining a public power system and that citizen's desires, such as having more wind energy (as documented in surveys), are not held to the mercy of publicly unaccountable energy officials

Cons: As long as the professional advise of energy experts are considered, there are no cons identified.

Public Power/Private Development/State Law

Continued from previous page

*** Encourage our Federal representatives to extend the Federal Production Tax Credit**

Pros: The Federal Production Tax Credit has been one of the greatest, if not the greatest, stimulants to wind energy in the United States. The tax credit helps stimulate the development of clean and renewable energy at a time when the impacts of Global Warming are becoming more clear. The tax credits help wind energy compete with the large direct and indirect subsidies provided to the fossil fuel and nuclear energy sectors. Extending the tax credit with a longer horizon will help smooth out the stop and go nature of wind energy development in the United States.

Cons: Tax credits obviously have an implicit cost of lost revenues for the government. Subsidies can alter free market forces. The Federal Production Tax Credit does little for Nebraska if it does not incorporate private or CBED wind farms.

*** Encourage our Federal representatives to provide REPI credits on par with PTC in terms of long-term assurance and financial benefit**

Pros: Such action would remove the significant disadvantage that Public power has in relation to private power since REPI credits vary from year to year and are under-funded to meet demand while PTC credits are guaranteed for 10 years. Such action would likely make wind power more cost effective for public power and thus stimulate wind energy development, especially in state's with public utilities..

Cons: Tax credits obviously have an implicit cost of lost revenues for the government. Subsidies can alter free market forces.

*** Work with the unicameral to develop laws and policies that encourage private companies and CBEDS to develop wind farms and the supporting infrastructure (such as expanding the grid).**

Pros: The Unicameral is capable of removing many barriers to entry that private wind developers face in Nebraska and can be done in a manner that does not disrupt the Public Power system of providing electricity to end users.

Cons: As long as actions are taken with Public Power in mind, there are none identified.

* **Encourage an increase in the state's renewable energy tax credit to offset the disadvantages of REPI**

Pros: Expanding the state's renewable energy tax credit can stimulate wind energy in Nebraska. The tax credit helps stimulate the development of clean and renewable energy at a time when the impacts of Global Warming are becoming more clear.

Cons: Tax credits obviously have an implicit cost of lost revenues for the government. Subsidies can alter free market forces. The size of the tax credits that Nebraska may be able to offer may not be large enough to match the cost-benefit ratio of other potential stimulants the state could implement.

*** Encourage Public Utility Boards to train or hire staff with experience in renewables**

Pros: Providing more renewable training to public power staff may make public utilities more willing and able to develop wind energy.

Cons: Training has obvious costs in fees, travel and lost production. Training may not be a primary reason why public power entities are not developing more wind energy.

Public Power/Private Development/State Law

Continued from previous page

*** Encourage qualified supporters of renewables to run for seats on their Public Utility Boards**

Pros: Having more "pro-wind" advocates on Utility Boards would likely increase the development of wind energy projects including some feasible projects that may be held up at the present time.

Cons: Electing Utility Board members with too strong of pre-conceived bias in favor of wind may lead to some failed wind energy projects that could actually set back wind energy development in Nebraska.

*** Educate public power utilities on the in-direct benefits of renewables such as local economic benefits**

Pros: Making public utilities and their boards aware of the local economic benefits wind energy provides may make public power more interested in developing wind.

Cons: Regardless of any public utilities willingness to develop wind energy, they still have to comply with state statutes such as the least cost mandate and the other economic, development, and transmission realities.

*** Work to unify efforts in promoting renewables**

Pros: Getting all of the wind energy advocates to work together can provide greater influence for change and help build momentum instead of having several groups 'reinventing the wheel" in their processes.

Cons: Complacency can set in if advocates believe "the problem is being addressed" by a single group.

*** Develop a new paradigm in this state geared toward exporting electricity**

Pros: Exporting wind generated electricity to markets such as Colorado can potentially provide enormous economic development in Nebraska and could ultimately cut the cost of electricity to Nebraska consumers in the long term.

Cons: Establishing wind energy export markets will involve large investments, especially in transmission.

*** Encourage legislation mandating new conventional energy investments be offset as a set percentage of renewables**

Pros: Would obviously stimulate wind energy in Nebraska. Any increase in cost is an investment in helping to offset the negative externalities associated with coal and nuclear generation. Greater wind generation can lead to more local economic development in Nebraska.

Cons: Mandating a certain type of energy can lead to higher costs than if the free market chooses the source.

Least-Cost Mandate

*** Generalize the least-cost statute to allow consideration of the non-monetized benefits of clean Renewable energy**

Pros: Including costs such as carbon emissions, air pollution, and importation of resources associated with coal production and considering the economic development potential wind energy provides in the least-cost mandate would make wind energy more economically feasible in Nebraska

Cons: If cheaper electricity is more important to Nebraskans than reducing air pollution, helping address global warming, and promoting rural economic development, then generalizing the least-cost mandate would not be advisable. Environmental externalities are difficult to accurately calculate.

*** If least cost statute not generalized, provide an expense allowance for renewable energy**

Pros: Proving an expense allowance for wind energy above the least cost options helps address carbon emissions, air pollution, and economic development issues without the potential of steeply increased electricity rates.

Cons: If cheaper electricity is more important to Nebraskans than reducing air pollution, helping address global warming, and promoting rural economic development, then providing an expense allowance for renewable energy would not be advisable.

*** Increase the least-cost renewable exemption for renewable energy facilities (presently 10mw)**

Pros: Increasing the least-cost renewable exemption for renewable energy facilities is a simpler way to calculate the costs of coal and nuclear production and the benefits of wind energy because the level of benefits are already assumed.

Cons: Assuming the level of benefits rather than calculating them may lead to exaggerating the benefits of wind energy production. If lower electrical rates is a higher priority for Nebraskans than reducing air pollution, helping address global warming, and promoting rural economic development, then providing an expense allowance for renewable energy would not be advisable.

*** Change statute to exempt non-emission generators of electricity to not have to comply with the least cost alternatives**

Pros: Exempting all non-emission generators from the least-cost renewable exemption is probably the simplest way to calculate the costs of coal and nuclear production and the benefits of wind energy because the benefits are already assumed.

Cons: Assuming the level of benefits rather than calculating them may lead to exaggerating the benefits of wind energy production. If lower electrical rates is a higher priority for Nebraskans than reducing air pollution, helping address global warming, and promoting rural economic development, then providing an expense allowance for renewable energy would not be advisable.

*** Educate the public including about how the benefits of regional renewable energy development can bring to their local economies**

*** Landowners who would like to capitalize on the economic benefits that will accrue to them from wind energy development should band together and form a voice that is heard in City Council and State Legislative chambers.**

State Incentives for Wind Development

*** Pass legislation that enacts a Renewable Portfolio Standard (The legislature should work with the public power utilities to ensure that they will not be saddled with unrealistic mandates)**

Pros: A Renewable Portfolio Standard may have the greatest impact in stimulating growth in the wind industry in Nebraska. The growth in wind power could stimulate economic development in addition to the general benefits of wind power including Nebraska doing its part to reduce greenhouse gases.

Cons: Since an RPS mandates a certain type of power instead of letting the free market decide, there may be a higher cost (However, it should be noted Nebraska's electricity system more closely resembles a socialist style system than a free market capitalist system.)

*** Allow a sales tax exemption for wind turbines and the related ancillary equipment**

Pros: A state sales tax exemption for wind energy components could cut the price of wind power projects by up to 5%. This is very significant considering the wind projects require high levels of up-front capital.

Cons: A sales tax exemption comes with the loss of revenue for the state (although one could argue that you do not lose sales tax if wind turbines are not being built)

*** Enact net-metering laws that provide consumers retail-rate benefits up to their level of personal consumption.**

Pros: Net metering laws that provide retail rates to the point of consumption can make small wind energy systems feasible for farms, schools and large businesses. Net metering is simpler to set up and administer than the present setup which requires a separate meter. There will be times (such as 4 pm on a hot August afternoon) that small systems will provide very valuable electricity that will save utilities money. Being a public power state, it can be argued that net metering should favor the public over the utilities. Nebraska is one of only 10 states without net-metering legislation.

Cons: Small systems often dump electricity on distribution lines which provide less valuable electricity than if it is dumped on a transmission line. There will be times (such as 4 am on a late spring morning) that small systems will provide electricity that will be of little or no value to the utility. PURPA laws already require utilities to pay avoided costs. Net-metering will take revenue away from the utilities.

*** Develop a Renewable Energy Fund financed by a Systems Benefit Charge to provide capital for utility-scale wind energy investments.**

Pros: A renewable energy fund can provide funds and reduce risks for public utilities to develop more and larger wind farms.

Cons: Utility customers would be charged extra on their utility bills.

*** Encourage an increase in the state's renewable energy tax credit to offset the disadvantages of REPI**

Pros: Expanding the state's renewable energy tax credit can stimulate wind energy in Nebraska. The tax credit helps stimulate the development of clean and renewable energy at a time when the impacts of Global Warming are becoming more clear.

Cons: Tax credits obviously have an implicit cost of lost revenues for the government. Subsidies can alter free market forces. The size of the tax credits that Nebraska may be able to offer may not be large enough to match the cost-benefit ratio of other potential stimulants the state could implement.

*** Develop a state program to sell green tags**

Pros: NPPD has successfully implemented projects that involve green tags. A state system to promote more green tags can help export wind energy without the expense of transmission.

Cons: Even if green tags are sold, there still needs to be infrastructure set up to deliver the wind-generated electricity to local consumers.

*** Start an Anemometer loan program to reduce cost of wind testing.**

Pros: An anemometer loan program will help landowners interested in harvesting or marketing their wind resources document their wind more cost-efficiently. This will encourage more land owners to develop small wind systems as well.

Cons: An anemometer loan program will require some expense to purchase the equipment.

*** Create a Wind Energy Board modeled after the state's Ethanol Board**

Pros: A wind energy board can provide a valuable clearinghouse to provide information to landowners interested in developing wind energy. The board can be a point of contact that could match up potential investors with interested land owners and developers. Can serve an important advocacy role to promote wind energy in Nebraska.

Cons: The cost of operating a Wind Energy Board would either need to be funded by the state or through consumer fees.

Transmission

*** Expand the electric grid over a multi-state region**
*** Develop a system of Supergrids**

Pros: Integrating geographically disperse wind farms across the Great Plains increases the likelihood that wind energy is being produced at any given time, enabling a greater reliability from wind generated power in the overall electricity formula. The country's energy grid needs upgrading regardless of the need to provide transmission for wind power.

Cons: Developing a supergrid would require an enormous up-front, capital investment. A supergrid will run up against environmental conflicts and NIMBYism

*** Seek state and federal assistance to fund transmission lines in Nebraska and the Great Plains**

Pros: Transmission is one of the greatest barriers to developing wind energy. Expanding and upgrading the grid to enable more wind energy is in the national interest as it promotes inter-state commerce, energy security, reduces pollution and greenhouse gases. A government funded transmission investment could eventually be sold to private investors or public utility commissions. The country's energy grid needs upgrading regardless of the need to provide transmission for wind power

Cons: The cost of building transmission lines runs hundreds of thousands of dollars per mile. Expanding transmission will run up against environmental conflicts and NIMBYism.

*** Implement the Texas model of "competitive renewable energy zones"**

Pros: Since transmission takes longer to install than a wind farm, CREZ zones helps provide the best wind resources with adequate transmission to deliver electricity to market. When done properly, the risk of developing transmission lines can be greatly minimized.

Cons: Developing CREZ zones requires an enormous up-front capital investment. The planning coordination to identify the areas best suited for wind and matching them up with prospective wind investors takes time and money and must be done properly to assure investments are maximized.

*** Allocate transmission costs for new wind plants over the entire transmission network in the state. (Texas uses this provision).**

Pros: Accounting transmission in this manner obviously makes wind energy projects much more profitable and thus encourages more wind energy development.

Cons: The accounting gimmick understates the true cost of developing wind energy and could result in less efficient wind projects being developed.

*** When larger markets such as Denver witness a major blackout, use it to promote the development of transmission in the US.**

Pros: Magnifying problems when issues are headline news helps stress the importance of expanding the grid to provide greater energy security.

Cons: Successful opportunism can sometimes lead to rushed and poorly thought out projects and legislation.

*** Work with the DOE to work on distribution issues.**

Wind Dispatchability

*** Secure additional funding for research into developing efficient storage for wind energy**
*** Support studies and R&D to develop storage and generating options that can complement the intermittency of wind generation**

Pros: If an efficient system of storing wind energy can be developed, wind energy could become a base-load source of energy which could make Nebraska a large exporter of energy.

Cons: Research obviously has a cost commitment that does not guarantee success.

*** Educate consumers and public power providers that high volumes of wind, even up to 20%, can be feasibly integrated into a large electric distribution system or pool without disrupting reliability.**

Pros: The variable nature of wind has led to misconceptions that wind is not reliable. Education can help people understand that wind can be integrated into the electrical system at relatively high levels without significant problems.

Cons: As long as education is presented in a factual manner, there are no cons identified.

*** Expand the size of the power grid to more easily incorporate wind variability.**

Pros: Integrating geographically disperse wind farms increases the likelihood that wind energy is being produced at any given time, enabling a greater reliability from wind generated wind in the overall electricity formula. The country's energy grid needs upgrading regardless of the need to provide transmission for wind power

Cons: Expanding the grid requires large, up-front capital expense.

*** Develop Buyers Clubs**

Pros: Buyer's Clubs can help consumers fund wind energy without government mandates. There has been occasions where green power purchasers ended up with lower energy bills in the long term, especially in areas that provide natural gas-produced electricity.

Cons: Buyers clubs can place an unfair burden on responsible consumers who finance the benefits of cleaner air and reduced green houses gases that are also enjoyed by "free riders." Poorly implemented projects such as the LES buyers club set back the prospect for future programs.

*** Expand the use of hydro-electricity to enable a firm backup to wind**

Pros: If Nebraska expands its use of hydro-electricity, it could effectively use this source as a firm backup to wind farms, such as the system between Denmark and Norway/Sweden

Cons: Most existing hydro-electricity capacity is already accounted. Developing new hydro-electricity is difficult due to Federal regulations, environmental impacts, water rights, and water availability.

*** Evaluate the effectiveness of CAES systems**

Wind Data

*** Provide a state-funded wind monitoring network for the state using an entity that will be accepted as an honest broker**

Pros: Having good wind data makes it easier to evaluate the potential of wind resources. If the data is taken over several years it helps iron out any anomalies. Having the data can also develop projects faster since investors will not have to take months and years to have good site readings

Cons: Wind monitoring programs cost money.

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Pros: Having good wind data makes it easier to evaluate the potential of wind resources. If the data is taken over several years it helps iron out any anomalies. Having the data can also develop projects faster since investors will not have to take months and years to have good site readings

Cons: Wind monitoring programs cost money.

*** Enable wind site data that is easily accessible to the general public and private sector**

Pros: Collecting good data is meaningless if it is not available for easy inspection.

Cons: Establishing a data bank takes some time and money to create and maintain.

*** Start an Anemometer loan program to reduce cost of wind testing.**

Pros: An anemometer loan program will help landowners interested in harvesting or marketing their wind resources document their wind more cost-efficiently. This will encourage more land owners to develop small wind systems as well.

Cons: An anemometer loan program will require some expense to purchase the equipment.

Finance Issues

*** Develop a State Utility Bond Fund for Renewable Energy**

Pros: Since a large proportion of wind energy expense is up-front capital cost, creating a state utility bond fund can help public power districts access funds to develop larger, more efficient wind farms.

Cons: Creating a bond fund would require charging fees to customers or allocating state funding.

*** Create an environment that is conducive for wind energy investment for companies with the financial ability to fund wind farms that are large enough to enjoy economy of scale benefits.**
*** Create an environment that is conducive to the development of Community-Based Energy Developments (C-BED).**

Pros: Since the private sector and CBEDS are more capable of taking financial risks and building larger, more efficient wind farms, enabling private sector/CBED wind energy wind generation in Nebraska could greatly increase Nebraska's wind industry.

Cons: Accommodations to private sector/CBEDS need to be done in a manner that protects the public power districts monopoly in providing electricity to end users.

Finance Issues

Continued from previous page

*** Encourage our federal representatives to provide additional funding for Clean Renewable Energy Bonds and other mechanisms that assist public entities develop large scale wind farms**

Pros: Since a large proportion of wind energy expense is up-front capital cost, Clean Energy Renewable bonds can help public power districts access funds to develop larger, more efficient wind farms. CREBs funding also helps public utilities compete with private utilities which have greater Federal incentive programs.

Cons: Expanding the CREBs program costs the government money.

*** Develop a Renewable Energy Fund financed by a Systems Benefit Charge to provide capital for utility-scale wind energy investments.**

Pros: A renewable energy fund can provide funds and reduce risks for public utilities to develop more and larger wind farms.

Cons: Utility customers would be charged extra on their utility bills.

Wind Turbine Placement

*** Develop a state wind verification program that certifies potential wind generation locations are suitable for transmission, wind thresholds, wildlife, zoning, and, airports.**

Pros: Certifying wind generation enhances private investments by providing greater assurance to investments that potential risks are minimized, investors do not have to take time and money to address these issues before investing, and projects can be implemented faster. Certification systems obviously helps reduce conflicts with the environment and local citizens.

Cons: Certification processes take time and money and do not guarantee success.

*** Work with the Game and Parks Commission and the Fish and Wildlife Service to identify areas where wind farms would conflict with wildlife habitats or migratory bird routes.**

Pros: The impact wind farms have on wildlife can be greatly reduced if wind turbines are located in areas that minimize the conflict potential. These agencies have shown willingness to be involved in such processes.

Cons: The only con in working with these agencies would be if the bureaucrats exaggerate risks to wildlife.

*** Work with the Game and Parks Commission to mitigate the impact to birds, bats and other wildlife**.

Pros: Even in areas with potential wildlife conflicts, there are mitigation methods to greatly reduce impact on wildlife. Mitigation efforts have been proven to work in Nebraska. These agencies have shown a willingness to participate in such mitigation efforts.

Footnotes

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Readings Suggested by Survey Respondents

"Be the change you wish see in the world,"
-- Mahatma Gandhi.

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B--- http://www.iht.com/articles/2006/02/19/news/bush.php
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G--- A study was conducted for the Governor in 2003 by Ed DeMeo of Renewable Energy Consulting Services, Inc. His report entitled *Accelerating Wind-Power Development in Nebraska: Status, Recommendations and Perspective,* includes an excellent analysis of the previous questions. His report can be found at: http://www.neo.ne.gov/reports/accel_wind.htm
H--- Steve Clemmer of the Union of Concerned Scientists also conducted a study in 2001 on the benefits of passage of a renewable portfolio standard in Nebraska. His report can be found at: http://www.ucsusa.org/assets/documents/clean_energy/strongwinds.pdf
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"Don't quote, tell me what you know,"
-- R.W. Emerson

The following pages contain the responses received from PADD's wind energy survey. These statements are the opinions of the survey respondents, and are not to be construed as being the opinions of the Panhandle Area Development District or its staff.

The following survey responses are edited where necessary to protect the identity of the respondent. However, in some instances where entities discussed their activities, it was not possible to keep the entity anonymous, but the individual was still kept anonymous.

Since these responses were received via e-mail, introductory statements were, for the most part, removed. However, all or part of some introductions are included if they provide pertinent information or comments. Furthermore, no effort was made to correct the spelling or grammar of the following responses.

Response 1.

"Being in the utility industry…(edited to remove name and position)… I may appreciate more than the general public that wind power is not as simple as it appears. Along with the many good aspects of wind, there are some not so good complicating issues. It is unfortunate when folk think the power company should just put up a wind generator on top of that high hill there, where the wind is always blowing, and do not even consider it would take six miles of transmission line to get it to the distribution grid - assuming that the line is not already being used to capacity - which nowadays it well could be. This is just one of many issues that wind proponents need to be made aware of, to keep proposed projects in the present real world."

Anyway - to your survey.

Question # 1 First - according to the U.S. Department of Energy's National Renewable Energy Laboratory, their U.S. Wind Resource Map shows that the large majority of Nebraska is classified as "Fair" for wind resources. The map is based on a scale of 2-7 with 2 being poor wind, and 7 being classified as superb wind - as I said, most of Nebraska is a "3" which is fair. Two areas of our state are a 4 (Good) - north central and the extreme southwest corner of the panhandle around Kimball. There are 10 states with outstanding wind resources, and Alaska has a lot of areas classified as superb. According to this map, Nebraska has probably the 14th or 15th highest potential. The southeast states have little wind energy potential.

From other information I have (this time the Lawrence Berkeley National Laboratory), 12 states have mandated Renewable Portfolio Standards in place and Colorado made it 13 last year. 15 states have state funded "Renewable Energy Funds" in place. Our legislature is addressing a few energy conservation issues and renewable issues this year, but one answer to your survey question is that the Nebraska state government has not promoted, forced, or funded wind energy as much as some of our neighbors. Another more blatant answer is that the Nebraska panhandle is not populated by as many environmentalist type as areas in Colorado and other mountain states, who request and promote wind (or any form of renewable energy) and are able and willing to pay the premium price for it - wind is more expensive than grid power unless it is subsidized by tax credits.

My wish would be that more effort be made to educate that there is a lot more to wind energy than just finding a windy spot and plopping up a wind turbine. This would be a very good and easy thing if the public were willing to do without electricity when the wind wasn't blowing, or put up with varying voltages and frequencies, but I suspect that these would not be acceptable complications.

Believe it or not, I am a proponent of more wind, and support this proposal, but I do get frustrated with so many people coming in to tell me how they have the best place in the area for a wind turbine, and all I can see is dollar signs in their eyes - with no concept of how much the installation would cost.

Response 2

Why does Nebraska have so little wind energy? Two key factors come to mind:

1. Conservatism. Nebraska is a conservative state. When has Nebraska recently been the leader in anything? Conservatism is more than just a political philosophy. It is an attitude towards change. And our attitude towards change needs improvement.

2. Cost. Follow the money they say. Wind in most places doesn't come close to competing against elec plants powered by cheap coal. And in a conservative state where cutting taxes is always far more popular than investing in the future ("change"), cost and money talks.

Of course the railroads won't be too excited about wind cutting into their coal-fired profits, so expect their lobbyists to be anywhere wind energy is moving forward.

We don't factor into the cost of coal-fired electricity any of the environmental problems associated with it (pollution and global warming). Most folks in this state are openly dismissive of such environmental problems, led by their President Mr. Bush who prefers to believe the 'science' of popular author Michael Crichton over the overwhelming consensus of international climatologists:

http://www.iht.com/articles/2006/02/19/news/bush.php

http://www.nrdc.org/globalWarming/fcrichton.asp

Most people perceive wind power as more 'whacky environmentalist propaganda,' fueled by the anti-science and anti-intellectual blabberings of Rush Limbaugh and FOX News.

What can be done to change this? Very little in the short-term in my opinion. Attitudes and perceptions are slow to change, particularly in a conservative state. America's abundance of coal will continue to provide cheap electricity for at least the next few generations, making wind a politically-unpopular, more expensive alternative. A crisis of some kind is the only thing, in my opinion, that will change these perceptions.

Some catastrophic 'natural disaster' conclusively linked to global warming might do the trick, although I'm not even sure that would work (the main problem with Katrina was not more powerful hurricanes possibly due to higher global temps, but God's punishment of the Big Easy for immorality and same-sex marriage).

Short of this, wind power will, in my opinion, be a tough sell. You will need govt incentives (or private donations) to build the turbines, and the more turbines will show people that the technology is there and it works. But it won't compete economically until we re-define our economic analysis to account for the short-term irrationality fueled by the fossil fuel bonanza we've enjoyed for 150 years. We've had a hell of a party using the "free" energy created and stored over billions of years of life and death. All we've had to do is dig and probe and out it came. Our entire Industrial Revolution was built upon it. And now the party's coming to a screeching halt:

http://www.museletter.com/partys-over.html

It will take those first few screeches (if we haven't had them already) to get most people to take the issue of fossil fuels serious enough to look beyond simplistic cost-benefit analysis and seriously consider wind--at least in this conservative state.

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On a more positive note, I think wind technology might be promoted as part of larger, far-more-inclusive federal initiative focusing on US energy policy. In the 1950s and 60s we perceived a threat to the American way of life from Soviet Communism. Part of our response to that threat was the amazing development and success of the US space program. Contrary to popular belief, our race to the moon had much less to do with lunar exploration than it did out-competing the Soviets in terms of technology (and potential military technology).

Today we face another threat: a diminishing fossil-fuel energy supply and increasingly difficult/ dangerous international relations/security due in large part to our presence in many foreign countries largely because of their fossil-fuel supplies (Iraq, Saudi Arabia, Emirates, etc.). Concurrently here at home we face an economy often criticized for failing to create new jobs that an American might support a middle class family upon, at the same time we keep creating more and more jobs overseas.

Why not solve several of these problems at once? Where is the federal (presidential or congressional) call for an energy independence initiative? Why not the same tenacity and funding and focus on making the US fossil-fuel-free by way of American ingenuity and entrepreneurship? Why can't we take the same federal dollars that put men on the moon and channel those dollars into developing home-grown alternative energy sources to eventually replace fossil fuels? Not only would this create thousands of good American jobs, but it would allow the US to remove itself from increasingly-complicated and dangerous parts of the world we are forced to deal with simply because of their fossil fuel reserves. And can one imagine the long-term profitability for US companies able to turn the corner on alternative energy development in 50 or 100 years when China and India begin to need alternatives to fossil fuels?

To me this is a no-brainer, but it will take the same threat perception and leadership in Washington that motivated our 60s space program. The free market can make many things work, but it would not have put a man on the moon in 1969 with serious and significant federal leadership. I believe the same is true today with respect to our energy situation.

Response 3.

1. Why does NE produce significantly less wind power than surrounding states? I suspect the "problem" is the wonderful service that public power has given to NE. Public power in NE has been very good at generating cheap and reliable electric power. Currently, public power is required to choose options that are least expensive (or least expensive in the short run). Public power's economic analysis does not include other impacts such as pollution, community sustainability, economic impacts of different power generation options, etc. If these other costs and benefits are added to the analysis, the spectrum of choices may be much different. Most of the wind energy development incentives do not provide public power a major incentive. Also public power has historically concentrated on meeting the power needs of Nebraskans and not looking outside the state. I think that encouragement of commercial power producers, which may require a change in state law, would assist in developing NE as a major wind energy producing state.

2. What can various groups do to encourage more wind energy development in NE? I think here the biggest opportunity will be the encouragement of commercial power producers to come to NE. The idea here is not for them to generate and sell power in NE but to other markets, especially in CO. Selling wind power's environmental benefits will help. More importantly, selling wind power's economic impacts will get you more.

3. Other comments or suggestions. Collect good data of the wind resources in the panhandle. This means a multi-year (minimum of 3 years, 5 years would be better; data needs to be up to a minimum of 100 meters) study of wind energy resources in the panhandle. This data needs to be an excellent quality and readily available for free. I suggest contracting with UNL to collect the data. UNL will be accepted as an honest broker. If a location has the economically viable wind resources, that location will sell itself. Work with the unicameral to develop laws and policies that encourage commercial companies to develop wind farms and the supporting infrastructure (such as expanding the grid).

RESPONSE 4:

Nebraska has fewer wind energy projects because our Public Power system already provides relatively cheap electricity. Costs are kept low by publicly owned power and close proximity to Wyoming coal resources. Furthermore, State law prohibits NPPD from purchasing power from outside entities for more that what it costs them to produce electricity themselves. For what it costs to produce wind power right now, private entities cannot sell power to the grid for as little as what NPPD is allowed to pay. Secondly, the "best" winds, i.e. 20-30 mph sustained winds, tend to be in remote areas of the state that are far from the main lines that can handle that amount of power. Essentially, the infrastructure is not in place to put the turbines where they would operate most efficiently. To do all this the *right way*, it will require some policy changes and some pretty burdensome upfront costs.

NPPD has recently partnered with UNL to fund the Nebraska Center for Energy Sciences Research, demonstrating that they are taking steps to investigate and move toward more renewable power sources. As we have seen with gas and diesel prices, we now know that the best time to build an oil refinery in the U.S. was about 10 yrs ago. Hopefully we won't make the same mistakes with electricity.

RESPONSE 5:

Why does Nebraska produce significantly less wind energy than most of its neighboring states, given Nebraska has the 6th greatest potential for wind energy in the U.S.?
We are a public power state. Our rates are less than our neighboring states. The original investment in wind energy is very expensive.

What can the state, cities, counties, energy providers, utility users, landowners or other entities do to encourage more wind energy development in Nebraska?

Continue to encourage more wind energy development by offering incentives. If turbines are placed on farms or ranches the owners need to be receive the appropriate rent. No other comments.

RESPONSE 6:

1. We need state incentives, and more cooperation from NPPD Wind and land are not an issue, but tying into the grid is the problem and then a fair Kw price for delivered energy

2. We need to seek legislative state assistance and probably help with the DOE to work on distribution issues. We have amazing wind potential but a selling price of$.019 per Kw doesn't work

3. I feel our best chance is to get grants and work with small energy distributors like Chimney Rock Power to make Wind Energy of Nebraska work

RESPONSE 7

1. There are several reasons that Nebraska is way behind in the development of the wind resource. The main reason is the state laws are such that a Public entity must build and operate the generation of power. To the best of my understanding the law states a public entity, meaning County Gov or Public Utilities would have to own and sell the power. This has killed us as a state because most green energy companies sell the power to areas willing to pay the slightly higher cost for green power, these companies are not public but private power generators. Also the generation of power from coal is so cheap that the utility Companies have made the choice for cheat subsidized power, I have visited with many of the Public utilities and the say the other factor is the wind does not always blow when you need the power and they don't think they can manage the power grid with spikes and valleys in generation. There is also the issue of transmission lines and substations, the best information I have been able to find is there is no more room on the lines we have access to. This will be a very costly to build infrastructure to support the new power.

2. The first thing that the state needs to do is pass net metering rules and regulation, this would allow individuals to invest, and the grid could handle it with little or no improvements. The other thing would be for all entities to take a proactive stance on the development of wind energy, I don't think it is the current attitude but I believe it is only a matter of time before that changes.

3. When you look at the big picture Eastern Wyoming has a much better situation then the panhandle. They have more wind and better laws to address the wind farm structure. There problem is the coal gas and oil control the energy in Wyoming. Nebraska needs this development because we have no other natural resources for energy as plentiful as wind, It only makes since.

RESPONSE 8

Not sure. However, I am aware of transmission constraints throughout the Great Plains.

Obtain ideas from states that have been successful in developing wind energy (e.g., Minnesota or Iowa).

The program that I work for is called the ***** We have developed the largest publicly available wind resource database for the Great Plains region. States such has Minnesota and North Dakota have an abundant amount of wind resource data available to the public. It may seem surprising, but developers often seek data from us in order to correlate with the data they collect. Hence, I believe that states can assist and encourage wind development by providing for publicly available wind data. I would like to see the State of Nebraska fund a wind monitoring network for the state.

RESPONSE 9

Nebraska has been slow to develop wind energy because our needs are growing at a rate that energy sources already in place can keep up. Developing any new energy sources require large amounts of capital meaning it would need collaboration between industry, local and state government. Capital that most Nebraskans don't feel we have.

The thought processes need to be changed. This would require an educational effort on present and future financial benefits from developing wind energy.

If we can demonstrate a financial benefit I think a state utility bond fund would be a method to finance the process. Education of private investors and guarantees by the state would encourage the financial backing necessary to move development forward. The educators would have to prove that there would be very low risk to the Nebraska tax payer.

RESPONSE 10

1. Why does Nebraska produce less than neighbors? Absent a national renewable energy policy other than the on again - off again PTC, individual state wind energy production is driven in large part by state policy. You need to develop a stable state policy framework to encourage the development of wind energy. The types of policies which have proven effective elsewhere include a state RPS, a Systems Benefit Charge (SBC) or Clean Energy Fund, or an Integrated Resource Plan. Other policies which have helped include a state tax incentive, a standardized tariff for small projects, and net metering.

2. What can we do to encourage more wind development? Other than developing a favorable state policy framework, Nebraska needs additional transmission into the wind resource areas to get the wind energy to market. Transmission expansion typically works on a 5 year or longer time cycle, while wind development happens in 1-2 years, so you need to solve the transmission problem in advance of the wind development.

3. Other thoughts? You have already conducted a deliberative poll, so you know the citizens of Nebraska want clean renewable energy. You are a step ahead of most others in this regard. You will need to work with your major utilities, OPPD and NPPD, to make it happen. **** at **** is a great policy resource, and if you haven't contacted him already, he can be reached at ****. Also, **** on the **** Board of Directors is a strong supporter of wind energy, and you might want to contact him at ****.

(Responses 11 and 12 on following pages)

Response 13

1. Lack of monetary incentive to do so.

2. See attached article. Entities should look to partner with other parties who are ahead of the curve or parties that have the funding like British Petroleum (BP).

The best chair in the boardroom of the world's second-largest oil company is not where you expect to find a committed environmentalist. But Lord John Browne of Madingley, chief executive of British Petroleum, is exactly that. Soft-spoken and highly regarded, he has vowed to take B.P. "Beyond Petroleum." It is seemingly contradictory, if not somewhat perverse, for an oil giant to place itself at the forefront of efforts to reduce carbon emissions. Old-style environmentalists may convulse at the idea of a "green" oil company, but under Browne, who sits on the board of the influential U.S. group Conservation International, B.P. has pledged to invest a billion in solar-, wind-, and hydrogen-energy technologies over the next decade. That's still minute compared with B.P.'s business in traditional oil and gas, who has better resources, expertise, and incentive to forge our energy future than a profit-driven energy company? Since 1990, B.P. has reduced its greenhouse-gas emissions by 10 percent. Says Browne, "The whole point is that no one should be able to use the environment without restoring it."

RESPONSE 11

1. Why does Nebraska produce significantly less wind energy than most of its neighboring states given Nebraska has the 6th greatest potential for wind energy in the U.S.?

Nebraska has a unique utility structure with 100% public power. In addition, it is very fragmented in its structure, thus an individual city may be controlled by three or more entities, all of which have separate governing boards and little, if any, coordination between them. There is no means by which statewide renewable energy policies can be implemented - as in other states - through Public Utilities Commissions or through public referenda as happened in Colorado. These individual small public utilities have no policy incentives to move toward renewables in that each would only have a very small impact on the state as a whole. Add to this mix the fact that much of the state is powered by coal from Wyoming on long-term rather low-cost contracts - which are assiduously protected by coal companies and their lobbyists - and you have a system that is fairly closed to change.

2. What can the state, cities, counties, energy providers, utility users, landowners, or other entities do to encourage more wind energy development in Nebraska?

State: The state, to the extent that the law allows state level legislation in the public interest, should enact renewable energy targets and specific goals (Renewable Portfolio Standard as now exists in 21 states, including Montana, Iowa, Minnesota, Colorado and Texas). If state law prohibits such actions affecting rural electric coop policy, these goals should still be legislated and set as voluntary supported by incentives designed to attract rural electric coop participation. The most significant handle will be for the state, through legislation, to gain legal regulatory authority on public interest matters over the entire statewide electrical system.

Cities and Communities: Cities and communities in NE can also take advantage of the new federal law allowing for community aggregation whereby communities that wish to accelerate energy efficiency and renewable energy may aggregate together and become independent new customers requiring electricity providers to compete for their service. This may be hampered by present long-term contracts in which case only a state RPS mandate including state goals could allow aggregation for the purpose of obtaining renewable energy.

It is possible that within the current contract framework, cities could still create, by ordinance, the requirement that all new electricity demand growth be met by renewable energy while the contracts continue to provide for existing electricity.

Landowners: Those who would like to capitalize on the economic benefits that will accrue to them from wind energy development should band together and form a voice that is heard in City Council and State Legislative chambers.

Individual Companies and Corporations: These should start meeting a portion of their own energy needs by on-site wind and solar electric systems, reducing their demand on the utilities and bringing pressure to bear on utilities to start supporting utility interconnections ("net metering") of these systems. Net metering now exists in 39 states. ****, for example, with a single turbine, could probably offset 40% of their electricity use and another 20% with rooftop solar electric with all produced electricity entirely internal to its own operations. Its incentive would be the purchasing of 30-years of electricity at a fixed price with the federal production tax credits, accelerated depreciation and commercial investment tax credits all reducing the actual cost.

3. Other comments or suggestions.
It is now seen as inevitable that all energy prices will continue to rise and that carbon taxes and carbon offset financial mechanisms will become national policy within a fairly short time frame. The more NE can begin to reduce the adverse economic impacts of all of these by diversifying its energy resources, and capitalizing on its extraordinary renewable energy base, the more positive and stronger will be the state's economic future. The longer the state waits to start making these changes, the more it will reduce its economic competitiveness in the future.

Response 12

Thank you for your communication on the subject of wind energy. Domestic, clean energy research is a subject of interest to me.

The following is in response to your question, "Why does Nebraska produce significantly less wind energy than most of the neighboring states given Nebraska has the 6th greatest potential for wind energy in the U.S.?"

Investor-owned utilities have taken advantage of tax credits offered by the federal government, which significantly lessens the net operating cost of wind generation. Nebraska is the only all publicly-owned power state in the nation. Any profits of the Public Power utilities in Nebraska are returned to the owner consumers in the form of lower rates. Accordingly, there are no profits to pay taxes on, and the tax credits available to investor-owned utilities provide no similar benefit to Public Power-owned wind generation in Nebraska. Public Power does receive a renewable energy production incentive (REPI) payment. The funding for this must go through the annual federal budget and appropriation process. The benefit of this is not on par with tax credits that the IOU's receive, and the annual funding level is uncertain. Many other states also have state subsidies for wind power which Nebraska does not presently have.

The new Ainsworth Wind Facility at Ainsworth is the largest wind facility in Nebraska. To date, the performance of this facility has been above expectations. During the fall and winter, the load factor has been 50%, which is extremely good performance. With the seasonal weather changes in spring and summer, wind velocity and frequency are expected to be less, resulting in lower capacity factors in those seasons. Normal costs at Ainsworth are projected to be in the range of $37-$40 per MWH at an annual capacity factor of approximately 41%.

There are limited accounts of interest-free bonds (CREBS) available for renewable projects. If NPPD can make a case for building another 15 MW at Ainsworth, the facility may be expanded.

My interest in domestic energy research goes beyond wind energy. In 2005, NPPD sponsored a bill in the Legislature to give public power the authority to engage in the production and distribution of hydrogen. This was approved by the Legislature. Just recently, NPPD and the University of Lincoln have entered into a partnership for domestic energy research. NPPD has agreed to finance the energy research center with $5 million over 5 years, and it is the plan of NPPD to provide a total of $2 million per year for clean, domestic energy research. OPPD and Lincoln Electric System have also joined this partnership with the University.

Wind energy will always be intermittent. If production from wind could be converted by electrolysis to hydrogen, that hydrogen could then be stored and take on the characteristics of firm power, which is much more valuable than intermittent "non-firm"" energy. An electric utility would have a considerable cost advantage in transporting the energy (as electricity) over existing power lines to near the point of use.

This is the answer to your second question, "What can we do to encourage wind energy?"

Congress should give publicly-owned utilities equal incentives as it now gives to the IOUs. I would encourage your group to expand your area of interest to all forms of clean, domestic sources for energy. Non-firm wind energy has a place in the resource mix, but the greater need is for base-load generation. For the near future, it appears that nuclear power is best positioned for that purpose. Your group could assist the industry in dispelling the prejudice of myths against nuclear power which has resulted in so much damage to the transition to clean, domestic energy in the United States.

(Response 13 on page 60)

Response 14

1. Lack of monetary incentive to do so.

2. See attached article. Entities should look to partner with other parties who are ahead of the curve or parties that have the funding like British Petroleum (BP).

Response 15

1. Why does Nebraska produce significantly less wind energy than most of its neighboring states given Nebraska has the 6th greatest potential for wind energy in the US?

Nebraska is a Public Power State and therefore our rates and the cost of production are among some of the lowest in the nation.

I think Nebraska need to be careful with renewable wind energy with a capacity factor of 30 to 40 percent, if to much is installed it will end up costing the end use customer higher rates to pay for the investment.

The Federal Government has offered income tax incentives to Private Power Companies to develop renewable energy. Public Power does not receive income tax incentives but we do receive a small renewable energy production incentive. This incentive has to go through the federal budget process and ends up a little short as compared to the private companies, also if the Government has a budget shortfall the credit may not be funded.

2. What can the state, cities, counties, energy providers, utility users, landowners, or other entities do to encourage more wind energy development in Nebraska?

A. To encourage more wind and renewable energy development in Nebraska, we must support Federal and State legislation that offer incentives for renewable energy development for Public Power Systems equal to the incentives offered to Private Energy Companies.

Nebraska Public Power Districts 60 MW Ainsworth Wind Farm has been operating very well with a winter capacity factor of around 50%. We are watching the data very closely and when we have a full year of operation we will review the information and decide if it is in the best interest of NPPD and its customers to add additional wind energy. The Ainsworth facility has room for an additional 15 MW of generation and if it will be cost effective we will add on to this facility. We will also be looking at other resources for funding this project as well as other renewable energy projects.

RESPONSE 16

My brief response to your survey is as follows:

Because of the very low wholesale power rates in Nebraska it is hard for wind energy to compete with traditional generation sources. Even though the cost of wind generation has come down, because of its intermittent availability it cannot serve as a dependable source of baseload generation. Backup sources have to be available when the wind doesn't blow, increasing the overall cost of power. In addition, transmission facilities in the areas with the best wind resources may be limited, making the development of wind energy more difficult. The absence or inadequacy of state or federal incentives for renewable energy development by public power entities has also been a limiting factor.

While this may not be an acceptable answer to many, patience is necessary. As the cost of wholesale power from conventional sources increases and the cost of wind energy continues to come down, wind energy will fare better from a "least cost" perspective. The availability of the Clean Renewable Energy Bonds financing mechanism for public power entities that was in the Energy Bill hopefully will put public power incentives on a more equal footing with the tax incentives available to private developers and may result in additional development in Nebraska. In addition, this year the Unicam passed some modest state level incentives for renewable generation that is 1 megawatt and larger that may help in the development of additional wind energy in the state. Lobbying by your group for additional state and federal incentives, especially for small scale development, would be helpful.

My suggestion is that the Panhandle Area Development District broaden its focus beyond wind energy. The 25x25 Work Group is a national organization that you may already be aware of. If you are not please review the info on their website at www.agenergy.info. Their goal is development of the renewable resource potential (not just wind energy) of ag and forest lands in an effort to provide 25% of the energy consumed in the US by 2025. I think this kind of approach can do much more good for the Panhandle than just focusing on wind energy.

Response 17

** with ** forwarded your survey to me and asked for my comments. I have served on the wind energy committee of the Western Governors Clean and Renewable Energy task force. Though I'm not very familiar with the electric power system in Nebraska, perhaps I can offer a regional perspective.

Nebraska certainly has adequate wind resource to foster a strong wind power industry. The number one impediment seems to be regional transmission capacity. Either the existing lines are fully utilized, or they tend to be located at some distance from the best wind sites. Several state utilities commissions are considering policy changes that will encourage investment in new transmission that supports wind energy.

A second constraint is investment capital, although this is easing somewhat as more wind farms are put into production. The American Wind Energy Association offers a wealth of information with respect to evaluating and financing wind projects.

A third constraint is imposed by markets. Some utilities remain skeptical towards wind power due to reliability concerns, but the more progressive ones like Pacificorp and Florida Power are proving them wrong. State governments and regulators need to provide utilities with incentives to take the risk. Renewable energy portfolios have done this for some states. The federal production tax credit also provides incentive.

I've attached an executive summary of the committee's findings and recommendations. If you're interested in the full report, it is available at www.westgov.org/wga/initiatives/esa.

If a need for wind monitoring and site assessment arises, that is one of our specialties at **

RESPONSE 18

QUESTIONS AND RESPONSES REGARDING BARRIERS TO DEVELOPMENT OF WIND ENERGY IN NEBRASKA

1. (1a) Can a private developer in Nebraska create a wind farm and sell power to one of the public power districts or (1b) are they limited to "avoided cost" under PURPA?

(1a) According to a 1996 Nebraska Attorney General's Opinion (#96073), although a private power supplier may be able to build and operate an electric plant in Nebraska, it appears that private electric suppliers are prohibited from serving customers who are located within a public power agency's service area who are already being served by the public power agency, at least until it can show that the current supplier is unable or unwilling to provide adequate electric service.
In Nebraska each of the public power districts has an elected board which determines policy related to the district which includes the setting of rates. The public power districts are subject to the Nebraska Power Review Board –NPRB -- (the Nebraska equivalent of a Public Service Commission) which has limited jurisdiction over electric generation. The NPRB's jurisdiction and authority includes, but isn't limited to: approving applications for new electric power generating facilities, the establishment of each public power district's territory, and approval of transmission lines. The NPRB may grant a permit if it finds that the application for the proposed facility meets the statutory requirement contained in Neb. Rev. Statute 70-1014 that he facility will "serve the public convenience and necessity and that the applicant can most economically and feasibly supply the electric service resulting from the proposed construction without unnecessary duplication of facilities or operations". There are no other state statutes which would prohibit a private developer from seeking a permit to construct an electrical generating facility to sell electricity in Nebraska. However, when Nebraska changed to a statewide publicly owned electrical power system in the 1930's, statutes were enacted which grant public power districts and municipalities the authority to condemn any private electrical generating facility located within their jurisdiction. **As a result of the condemnation statutes no private development has occurred in Nebraska due to the risk of condemnation by a power district.**

(1b) In September of 2004 the Nebraska Attorney General issued another opinion (04024) which concluded that public power is subject to the provisions of PURPA. Under PURPA electric suppliers are required to allow any renewable energy generator with a facility generating under 80 megawatts to feed into the distributive energy system. However, electric suppliers are only required to pay avoided cost for any power fed back to the local distribution system by a customer-generator to the grid.

2. ***If they do create a wind farm, can one of the power districts condemn it and take it from them?***

See response to (1a).

3. ***Do the public power districts currently have any incentive (financial or otherwise) to get into renewable energy?***

A 1.8 cent tax incentive is available to public power under the federal Renewable Energy Production Incentive (REPI) (depending on available federal funding). MEAN received this credit for their 10.5 megawatt wind farm constructed near Kimball. NPPD also received the credit for the 60 megawatt wind farm constructed near Ainsworth.

The Nebraska Legislature passed a bill in the 2006 legislative session which grants a renewable energy tax credit to a power supplier that constructs a zero-emission renewable energy facility that generates greater than 1 megawatt. This credit is available to new facilities constructed after the effective date of the act (August 2006). The renewable energy tax credit is .075 cents for each kilowatt hour generated prior to January 1, 2010; .05 for each kilowatt generated prior to January 1, 2013; and .025 for each kilowatt generated before January 1, 2018.

There are no other state incentives.

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4. ***What would be the best legislative method to increase renewable energy development in Nebraska? a. Increase tax incentives or in lieu of tax forgiveness? b. Renewable energy standards. c. Net metering. d. Other***

See response to question #3. Since the legislature passed the tax credit just this year, it is highly unlikely they will increase the tax credit for several years. Whether or not an increased tax credit is adopted is dependent upon whether the public power districts seek an increase. It is also highly unlikely that in lieu of tax forgiveness legislation would be adopted because the political subdivisions would oppose losing this revenue stream.

The public power districts and the Rural Electric Association have formed a policy and lobbying organization called the Nebraska Power Association (NPA). The NPA, through a vote of its members, determines policy and advocacy positions for the public power system. The NPA has opposed legislation introduced in the last 14 years to advance the development of renewable energy. Net-metering legislation has been introduced 4 times however, none of the bills have made it out of Committee. The legislation, in addition to other standards, would require public power districts to pay the retail rate to the customer-generator for any energy fed back into the distribution system. A net metering bill was introduced on behalf of the REA which would have required only the avoided cost to be paid to the customer-generator for any energy fed back into the distribution system. It also included provisions which would have imposed any additional costs on the customer-generator such as the cost of new transmission lines.

Legislation to enact a Renewable Portfolio Standard (RPS) has been introduced 3 times in the past 11 years. It has been opposed by members of the NPA who have testified that the NPA supports only a voluntary approach in which each public power district could decide the amount of renewable energy in its energy portfolio and the time frame in which it develops the additional renewable energy. The public power district representatives have also taken the position that they will not support an RPS unless a federal RPS is adopted. However, when the RPS was included in the federal Energy Policy draft, the Nebraska public power districts successfully lobbied to have all public power districts excluded from this requirement.

See the response to (1b) – the last paragraph

Green pricing, disclosure, and public benefit fund legislation have also been introduced. These policies have been opposed by the public power districts and therefore did not make it out of Committee.

5. ***Of the above, which is the most likely to get through the Legislature in the current climate?***

See response to 4 a. – increase of renewable energy tax credit if it is supported by the public power districts.

Conclusion:

The Energy Foundation awarded the Nebraska Farmers Union and the Center for Rural Affairs grants to provide public education on wind energy and its economic benefits to rural landowners and surrounding communities. The other goal of the grant is to work with Nebraska Public Power District (NPPD) (which covers most of the state of Nebraska) in order to persuade NPPD to work with farmer-owned coops that have private financing to develop private wind farms which would feed energy generated to the local distribution system. The Farmers Union through the efforts of its Executive Director John Hansen, has made some headway towards NPPD's agreement to this goal. However, NPPD is still proposing to pay only the avoided cost rate for energy fed into the local distribution system rather than pay the coop the retail rate or a slightly less than the retail rate.

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In order to achieve further development of wind energy in Nebraska, wind energy supporters must be elected to the boards of the two largest two public power districts – OPPD and NPPD. Changes must also be made to the make-up of the REA boards throughout the state. (The REAs have been the strongest opponents of net-metering legislation). Though state senators direct all state policy – including policy regarding public power – state senators defer to the policy positions of the public power districts because their boards are also elected. Given this deference to elected public power boards, changing the make-up of the boards is imperative in order to move Nebraska either towards development of more public power-owned wind energy generation and/or the public utilities partnering with private developers (particularly farmer-owned coops) to develop wind energy.

Nebraska citizens are overwhelmingly in support of wind energy. In 2003 NPPD conducted a Deliberative Poll in which they polled over 100 of its customers throughout the state. The results showed that 96% of those polled said they were in favor of NPPD developing 200 megawatts of wind energy even if it meant an increase of $1 to $2 in their monthly utility bills. Thirty-seven percent thought that more than 200 megawatts of wind energy should be developed by NPPD.

A separate poll was conducted by the University of Nebraska Center for Applied Rural Innovation in March of 2005. The Center received 2,851 responses from 6,250 randomly selected households in Nebraska's 84 rural counties. Nearly 90% of respondents believe the government should encourage the use of renewable energy sources. Sixty-five percent also believe alternative energy sources are better for the environment than traditional fossil fuels, while more than 70% of respondents believe 10% of Nebraska's electricity should come from alternative energy sources, and 84% said wind power should be produced and used locally. Though these numbers are excellent there is a further need for public education including the encouragement of citizens to elect board members in favor of renewable energy and to demand of their current board members the development of renewable energy.

The other change which must take place within the public power system is incorporation of management and employees into the system who are educated and experienced in the costs, technology, and benefits of wind energy. Most of the managers and staff are schooled and experienced only in fossil fuel and nuclear power generation. Public power board members generally follow the recommendations of management/staff in their policy decisions because they trust management and staffs' analysis, training, and experience. It is important that new board members are elected that seek training for their employees regarding wind energy technology, or direct the hiring of employees familiar with renewable energy technologies. Management also needs to be aware of the rural economic development advantages of partnering with private entities – such as farmer coops and communities to develop renewable energy generation. If these changes do not occur, Nebraska will remain stalled in wind energy development and will not realize its renewable energy potential.

Studies

A study was conducted for the Governor in 2003 by Ed DeMeo of Renewable Energy Consulting Services, Inc. His report entitled *Accelerating Wind-Power Development in Nebraska: Status, Recommendations and Perspective,* includes an excellent analysis of the previous questions. His report can be found at: http://www.neo.ne.gov/reports/accel_wind.htm

Steve Clemmer of the Union of Concerned Scientists also conducted a study in 2001 on the benefits of passage of a renewable portfolio standard in Nebraska. His report can be found at: http://www.ucsusa.org/assets/documents/clean_energy/strongwinds.pdf

Other recent studies which have been conducted on the development of wind energy in Nebraska are located on the Nebraska Energy Office's web site at: http://www.neo.ne.gov/renew/wind-renewables.htm

RESPONSE 19.

1. Why does Nebraska produce significantly less wind energy than most of its neighboring states given Nebraska has the 6th greatest potential for wind energy in the U.S.?

Response: I think there are many reasons that factor into why Nebraska does not have more wind generation facilities. The following list is probably not comprehensive, but in my opinion each of the reasons likely contribute to some degree. The reasons are not listed in any particular order.

a. Nebraska's electric rates are some of the lowest in the nation. This factor makes wind energy less competitive in Nebraska, and therefore less attractive to both investors and Nebraska public power entities considering whether to construct wind generation facilities in Nebraska. The costs to wheel or transport electricity out of Nebraska to sell in other states can be problematic because there may not be sufficient transmission capacity available to transport the electricity. The cost to build new transmission lines often makes a project cost-prohibitive.

b. Nebraska does not have retail competition in its electric industry. Investors and investor-owned companies cannot build wind facilities in Nebraska and attempt to market the resulting power to retail customers that may wish to consume and promote renewable energy.

c. Contractual arrangements in Nebraska's power industry. Most Nebraska power suppliers that purchase their electricity at wholesale have long-term contracts requiring them to purchase all their power needs from their current wholesale supplier. Other public power utilities or investor-owned companies therefore could not sell any power produced at wind generation facilities to any of the contractually bound electric utilities.

d. Eminent Domain. The majority of Nebraska's power suppliers are political subdivisions of the State of Nebraska, being either public power districts or municipalities. The remaining entities are cooperatives. As political subdivisions of the State, these entities can use the power of eminent domain if the taking would be for a public purpose. Although it is not certain whether any Nebraska power supplier would exercise its eminent domain power to take ownership of a wind generation facility, many investors and private businesses to whom I have spoken are concerned about the mere possibility. The uncertainty that eminent domain creates may cause private businesses to hesitate before constructing a generation facility in Nebraska.

e. Lack of transmission and constraints. One problem facing both Nebraska's public power entities and investors is the location of the prime sites for wind generation facilities. The areas of Nebraska where the wind capacity factor is the highest tends to be in the north central and southwestern parts of the state. These also tend to be sparsely populated areas, without a great deal of transmission lines. If significant transmission assets would have to be built to connect a remote location with a high wind capacity factor, needed investment could quickly mount and make the facility cost-prohibitive. Even if existing transmission assets are near a location where a power supplier wishes to locate a wind facility, there may be no transmission capacity available. This constraint would create the need for an upgrade or construction of a new line, which again can make the project cost-prohibitive.

f. Nebraska does not have a renewable portfolio standard. Some of Nebraska's neighboring states and other states in the region have some form of renewable portfolio standards. Since these standards usually require a certain percentage of the power supplier's electricity to be produced using some type of renewable energy, electric utilities not able to meet the standard must either construct renewable generation sources, or purchase power from other entities with excess electricity derived from renewable sources. It should be noted that although the renewable portfolio standards may increase the amount of renewable generation facilities, costs usually also increase. This means a rise in retail electric rates often accompanies the renewable portfolio standard.

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g. Mandate of Nebraska's public power electric suppliers. A review of Nebraska statutes indicates that the mandate for Nebraska's public power suppliers is to provide the public with its electricity needs in the most economical, feasible and reliable means possible. Although wind facilities are becoming more and more cost-competitive, the evidence I have seen indicates that they usually cannot produce electricity for the same cost as other more traditional facilities, particularly coal. Also, wind is not dispatchable, which does not lend itself well to bolstering the reliability of a utility's portfolio. It may be difficult for some public power utilities to justify a wind generation facility of any significant size due to the cost and reliability factors. Although these factors have served Nebraska well in maintaining very low electric rates, they may not serve to promote introduction of renewable facilities into a public power utility's portfolio.

2. What can the state, cities, counties, energy providers, utility users, landowners, or other entities do to encourage more wind energy development in Nebraska?

Response: The Nebraska Power Review Board has historically avoided participation in policy discussions concerning how to promote any particular type of energy. Such a role may create a perception that the Board or its staff has certain biases for or against particular types of generation facilities. This could prove detrimental when the Board is called upon to approve generation facilities in its role as a neutral quasi-judicial administrative agency. I therefore believe it would be best to leave the policy decisions to others, and respectfully decline the invitation to take a position regarding what might be done to encourage wind energy development in Nebraska.

RESPONSE 20.

Why does Nebraska produce significantly less wind energy than most of its neighboring states given Nebraska has the 6th greatest potential for wind energy in the U.S.?

Answer: 1. Taxes.
2. A need for State funding or incentive programs to initiate this type of economic development.
3. Market – who will be required to purchase the power?
4. Where will the power be introduced into the grid?
5. What will the costs be?
6. Feasibility.
7. Environmental – in relation to migratory bird fly zones. We are seeing problems in Texas.

2. What can the state, cities, counties, energy providers, utility users, landowners, or other entities do to encourage more wind energy development in Nebraska?

Answer: 1. Unify efforts – one unified effort would be much more productive than 10 different entities competing against each other for the same end result.
2. Need to pressure local, state and federal leaders for legislation to promote this initiative.

3. Other comments or suggestions.

If Nebraska truly has the 6th greatest potential for wind energy then I see no reason why we would not want to harvest this resource. We need to take advantage of these opportunities

RESPONSE 21.

The following response to your survey is by no means exhaustive. Also because of the unique nature of electrical power supply in Nebraska, not all of the approaches noted may be completely, or even partially, appropriate to our situation.

Why is the wind rich state of Nebraska so far behind in developing this resource and what can be done to turn that around? There are, of course, several factors to consider.

Electricity in Nebraska is comparatively inexpensive. Our public power system has been extremely effective in keeping the cost of electricity low. This makes it very challenging for alternative energy sources such as wind to get much traction.

Unlike several of our neighboring states, Nebraska has not implemented significant state policies to encourage wind energy development. States that have made long-term commitments, in terms of policy, toward renewable energy have, unsurprisingly, tended to attract more investment and development in those areas.

Other wind rich states, with associated wind developments, have often implemented "renewable portfolio standards" (RPSs). These RPSs require a certain amount of renewable energy provided electricity by a certain time. Where there are RPSs and wind you see more development both in terms of wind system installations and wind manufacturing plants. Nebraska Public Power District has set a voluntary RPS of 5%, with no deadline, for its system. By contrast, Minnesota has just increased their RPS to 20% by 2020.

Texas, one of the fastest growing states for wind power, has recently put into law a bill that not only increases their RPS goal (5,000 MW by 2015) but also includes something called "competitive renewable energy zones." These zones are areas that are to be identified as likely areas for renewable energy development, mostly wind, that will require extra power line capacity to be able to export that electricity potential. Since it takes much longer to put in power lines than to install wind farms, the folks in Texas are trying to get ahead of that curve so as to not stifle wind energy development in the longer run.

There are also efforts by the American Wind Energy Association (AWEA) to work through the Western Governor's Association to come up with some regional transmission development policies that would allow for increased wind energy development. These are still in the works and no official position or policy has been set on this issue as of yet.

In Minnesota, there has been a recent effort to re-localize the wind energy development in their state. This has been done through a legislative program called Community-Based Energy Development (C-BED). Instead of having out-of-state wind farm developers doing most of the development and taking many of the benefits with them after they're done, the C-BED program focuses on the farmers and other local state residents becoming the owners and operators of these wind farms. Before C-BED, Minnesota had their own production tax credit to encourage the development of wind power in their state but this was removed, at a savings to taxpayers, by the implementation of the C-BED model.

The economic benefits by shifting to a local economic development approach have been noted as being very significant verses the out-of-state developer based model. As usual, locally owned business keeps the cashflow in the community more than out-of-the-area owned business. You get a multiplier effect.

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Utilities are required by federal law to allow for interconnection with renewable energy systems because of the so-called PURPA law that was passed in the 1970s. The nature of the rates for interconnection were not specified by the law but are left up to the utilities within certain general parameters.

On the small-scale wind level, often considered to be up to 100 kW peak but usually much smaller, "net metering" has been proposed as a way to encourage small wind development. This is where a customer-producer has an electrical metering system that can run both directions. In high wind and low consumption periods, there's a possibility of running the customer's meter backwards.

The primary goal here, in most cases, is not to sell electricity to the utility at what is typically a lower than the cost of production rate but rather to displace the retail cost of energy for the customer. There is no statewide policy in Nebraska on net metering as found in other states. Each utility tends to come up with their own rules and some of these have been very economically unfavorable to the customer-producer.

While this policy is of interest to individual renewable energy enthusiasts, net metering has not provided all that much extra renewable energy production to the systems where it has been implemented. As a policy issue, it is a bit of a tempest in a teapot. That being said, the Nebraska Farmers Union supports net metering for small wind systems.

One other issue with regard to small to medium wind systems is the potential for refurbished California wind farm machines being installed in Nebraska. These machines have proven to be reliable by their years of service in California and are a bargain for smaller wind system customers.

There is currently a shortage of these machines because of delays in the repowering of the California wind farms by much larger megawatt class turbines. This has been for a variety of reasons including environmental ones. Bird kills by wind turbines have been quite high, comparatively, in the Altamont Pass area of California in particular.

The Altamont Pass area has a lot of migratory bird activity which is part of the reason that it is so hard on the birds in that area. This is a factor that should certainly be taken into account for Nebraska developments as we have our own areas of migratory bird flyways.

In some instances, threatened or endangered species, and associated laws, may limit wind installations in certain areas. The Ainsworth wind farm was able to effectively mitigate the endangered species issue on their site by using baiting techniques.

There are also shortages of megawatt sized wind turbines because of the current boom in wind power around the world. Many reports have noted a two-year wait on current orders for wind machines.

This has implications for wind farm developers who want to take advantage of the federal production tax credits on wind energy as they have only been recently renewed until the first of 2008. Unless there is a further extension of these tax credits, wind farm development may see yet another boom and bust cycle has it has in the past.

Wind power can be used as a hedge against future fuel cost inflation. Wind is inflation free and modern wind machines have estimated lifespans of 20 to 30 years. Power purchase agreements for wind can be very long term, often 20 years in length, compared to those for conventional energy sources.

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In Austin, Texas, increased fuel costs for conventional sources of energy have driven their electrical supply costs higher than those of wind energy. Since there is now a shortage of wind power to sell, the local utility is holding a raffle to sell off what remains of their current allotment. Those late to the dance will have to pay the higher conventional fuel costs.

A major shift in organizational focus will have to happen within public power to allow for large scale wind power development in Nebraska. In the past, the focus has been on production and distribution for local consumption. The new paradigm will involve changing the focus to local production for export. In particular, the local REAs are not at all set up for that kind of model of operation and certainly will need assistance and encouragement to make such a transition.

To my knowledge, there are no model ordinances for wind energy facilities in Nebraska. Some degree of standardization could be provided for wind energy installers by model ordinances and their implementation. This could reduce the uncertainty for developers and reduce the far too often uninformed arbitrariness of challenges to wind installations.

Pennsylvania, a very pro-active wind state, has developed such a model ordinance for their state. Issues of setbacks, noise, blade flicker, communications interference and other issues are all noted in this document.

Looking beyond just our neighboring states to the global marketplace, the countries that have taken an extremely aggressive approach to developing wind energy have tended to be the ones with the most wind development. Denmark and Germany with their "feed laws", a version of which has recently been adopted by Ontario, are of particular note.

In Spain, a requirement for local manufacturing of wind machines was added to their law. This has encouraged companies to build plants in Spain instead of allowing those companies to import them from neighboring countries. This has generated many local jobs in Spain.

Finally, I would recommend that those on your wind energy action committee seriously consider reading a book I use for teaching my on-line wind energy fundamentals class for ***** Community College. This book, "Wind Power: Renewable Energy for Home, Farm, and Business" (2004) is by a long-time wind activist named Paul Gipe.

Paul has probably forgotten more about wind power than I'll ever remember and this is a comprehensive, fairly up-to-date, read on all the basic issues wind power. It's a relatively easy way for most folks to get up to speed with the topic of wind energy.

follow-up

I should note one error in my note to you. Minnesota has not passed the 20/20 option as of yet. It passed one legislative house but has not completed the process.

According to the Union of Concerned Scientist's RPS map, Minnesota currently has a 19% by 2015 RPS for Xcel Energy and a 10% by 2015 RPS for the other electric utilities.

RESPONSE 22.

Even though Nebraska has the 6th greatest wind energy resource in the country it produces significantly less wind energy than a number of surrounding states partly because of the fact that Nebraska is unique in that it is the only totally public power state in the country, which precludes private utilities from building generation facilities in the state. That unique status is positive in a number of ways but it has also created uncertainty as to what types of wind projects could be developed in the state. NPPD is doing a good job of exploring ways to make more projects feasible in Nebraska.

From a policy perspective I would suggest that wind turbines and the related ancillary equipment associated with wind farm projects be made exempt from Nebraska sales tax, just like other farm equipment currently is. This would be a major positive factor that would help make Nebraska competitive with other states and help bring in equity partners as Nebraska's wind policy evolves. For individual wind turbines and smaller wind projects that farmers could use for their farmsteads, and perhaps for powering irrigation, Nebraska needs a good, progressive net metering policy. Many states have one. Nebraska does not. However, the federal Public Utilities Regulatory Policy Act (PURPA) law may actually require true net metering in Nebraska, if the law were seriously used. The question then becomes, at what rate? And, if it is true net metering it needs to be a system where there is only one electric meter (not two) and the electric meter runs in reverse, giving the wind turbine owner the full retail value when the turbine is operating... the retail rate that they pay for electricity when the wind turbine is not generating power.

One other factor is that some rural electric cooperatives have opposed wind energy at the national and state level. One other policy suggestion to stimulate wind energy development in Nebraska. Nebraska could enact a statute that requires 10% of Nebraska's electricity to come from wind power by a year certain in the future, 2020, for instance. Our conservative neighboring state to the Southwest, Colorado adopted a Renewable Energy Standard in 2004 requiring something similar along those lines

RESPONSE 23.

Our utility has an all requirements contract with ****, and are limited to purchasing power from any type of distributed generation in excess of 25 kW. We are not against wind generation if it makes sense. The major problem from the utility's perspective with wind farms is that there is no guarantee that the wind will be generating power at the time in which the consumer needs to use it, therefore creating a need to have some additional source of power when the wind is not blowing. This creates an additional means of generating. If a wind farm can be operated in concert with say a hydro generation plant that does not require a fossil fuel wind generation makes perfect sense.

The main reason that Nebraska utilities have not significantly invested in wind generation is due to the fact that the cost of electricity in Nebraska through the "Public Power" system is considerably less than the majority of the United States.

I have attached a power point presentation that I received from a manager of a Public Power District in the eastern part of the state on renewable energy. In it he has specific details on the wind projects located in Nebraska. He also goes through the areas that need to be considered before embarking on wind farm developments.

This morning I received a document from the "Center for Science and Public Policy in Washington DO.CO. concerning wind farms that I will put in the mail today.

RESPONSE 24.

1. Why does Nebraska produce significantly less wind energy than most of its in the U.S.?
There are a few general issues that are limiting further wind production in Nebraska
- One the limiting issues is related to wind energy policy and regulation. The second general issue is expenses that are over and above installation and operational costs.

Policy and Regulatory Issues

Nebraska has very low imbedded energy cost structure due to:

- Nebraska state statute requires public utilities in the state to build and Operate the least cost resource to serve the electric customers wind is currently not the least cost.

- Wind does not stack up well with the low cost structure of a coal fired resource due partly to low cost tax-exempt financing and access to plentiful Powder River Basin coal from Wyoming.

- There is not a rate of return incentive. Since Nebraska utilities are nonprofit, or providing service to customers at cost, they get no rate of return on investing in wind resources. In all of the surrounding states, the investor owned utilities that are installing renewables as part of their portfolios are gaining an 8 - l3% rate of return for their investment that gets added to the power customer rates.

- In most cases, the installation of wind resources in the surrounding states are a compromise for the state public utilities commissions rulings to allow traditional resources to be built. i.e. MidAmerican Energy in Iowa builds a790 MW coal plant; in exchange they must build a 160 MW wind farm to pass state regulatory requirements.

- Additionally, all investor owned utilities enjoy at least 10 years assurances that they will receive renewable tax credits for the investment. These credits go a long ways to making wind energy's cost in line with other traditional resources. In the case of public power utilities, the Renewable Energy Production Incentive (REPI) is authorized and appropriated by Congress annually and the funds have remained capped for several years. As more public utilities invest in renewables over time, the credit given to each existing and new renewable resource shares proceeds out of the same pool of funds and thus the credit to each project continues to shrink. This is a significant issue that is impairing growth in pubic systems. MEAN has worked with American Public Power Association (APPA) and other public power systems nationwide to lobby Congress to improve this situation.

Wind Energy Cost Issues

Additional expenses to relieve transmission constraints and variable costs due to technical operational issues also play a role in the lack of significant development of wind in Nebraska. A check of the wind dynamics in the state, according to Nebraska Energy Office research, shows that the highest wind output sites are located the furthest away from the major load centers in the state. This issue can cause problems on transmission operations and infrastructure issues that can require new transmission facilities to be built and will significantly add costs to projects.

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- For example, to expand the MEAN Wind Project at Kimball, MEAN must spend at least $2-3 million to expand the electrical transformers in order to access the transmission grid. Additional costs for potential transmission improvements to connect the wind farm with the expanded transformers must be paid by MEAN. These transmission improvement costs are on top of the costs for local site infrastructure and turbine installation. These costs and operational constraints make the resource less attractive to meet the policy of least-cost resource addressed above.

- Finally, transmission providers assess significant penalties when energy is scheduled from the wind farm but not produced due to lack of wind. At any given moment, MEAN's wind resources output might range from 1 MW to 17.5 MW with no notice and little ability to adjust other generation units instantaneously to "swing" with these constant fluctuations. Currently, there is no cost effective ability to store electricity; the Instantaneous load on the system must be served by the resources that are on line at that instant.

RESPONSE 25

1. In surrounding States, a large amount of wind energy has been developed due to the Production Tax Credit (PTC) available to investor owned utilities, as well as state imposed renewable energy mandates. Surrounding states such as Iowa, Minnesota, and Colorado have state mandated renewable energy requirements. In recent years, the primary incentive available to public utilities has been the Renewable Energy Production Incentive (REPI). This incentive has been greatly under-funded. For example, in 2005 appropriated funds were $4.96 million, and over $45 million would have been required to fully fund all projects that applied for funding. The Energy Policy Act of 2005 included the new Clean Renewable Energy Bonds (CREBs) program. It remains to be seen how adequately funded this new program will be.

Nebraska State law requires that new generation be the least-cost option, with one exception being that Nebraska law allows a Nebraska utility to build up to a 10 MW renewable energy facility without meeting the least-cost criteria. However, such projects must show some pubic benefit and be approved by the Nebraska Power Review Board.

Nebraska is a very sparsely populated state, and the best wind resource areas tend to be remote from the major population areas as well as available transmissions facilities. In most cases, it would be very costly to construct transmission to remote wind energy facilities.

2. Long-term guaranteed production incentives at either the federal or state level would encourage further wind energy development in Nebraska. This would include adequate funding of the REPI program, as well as the new Clean Renewable Energy Bonds (CREBs) program. Nebraska could provide a state sales tax exemption on wind energy equipment similar to that currently provided in several other states. At the local level, it might be possible to develop the community-based concept used in other States. Under a community-based plan, local farmers or landowners would form a limited liability corporation (LLC) to bring outside investors in to build wind turbines. Those investors would be entitled to a production tax credit and other incentives. A Nebraska public power utility would then purchase the wind energy. After 10 years, complete ownership of the wind energy facility would revert back to the local LLC.

3. Other comments or suggestions.

OPPD helped fund a 4-year study of wind speeds in Nebraska. Generally, this study showed that the best wind resources in Nebraska are located in north-central and southwest Nebraska. Wind resources within OPPD's service territory are generally not of high quality. However, OPPD continues to study potential sites.

The following pages contain the written responses received commented on the initial draft of this document. These statements are the opinions of the survey respondents, and are not to be construed as being the opinions of the Panhandle Area Development District or its staff.

The following survey responses are edited where necessary to protect the identity of the respondent. However, in some instances where entities discussed their activities, it was not possible to keep the entity anonymous, but the individual was still kept anonymous.

Since these responses were received via e-mail, introductory statements were, for the most part, removed. However, all or part of some introductions are included if they provide pertinent information or comments. Furthermore, no effort was made to correct the spelling or grammar of the following responses.

Post Response A.

In regard to the private development of wind energy, I'm not sure whether or not this option should necessarily be precluded.

Does the condemnation statute apply to generators that existed at the time that the statute was enacted--as well as new projects that have been approved by the Nebraska Power Review Board (NPRB)? It is my understanding that before a private developer could build a generator in the service area of a public power district that the power district would sign a waiver agreeing to it. Of course the NRPB would need to determine per the statute that the generator would "serve the public convenience and necessity and that the applicant can most economically and feasibly supply the electric service resulting from the proposed construction without unnecessary duplication of facilities or operations." So if both the public power district and the NRPB agreed that having a private developer build a wind energy facility was in the best interest of the public, and it was approved by the NPRB, then the generator could still be condemned? If you have not already done so, perhaps you could pose these questions to *****.

For all practical purposes, after a wind energy facility was approved by the NPRB, then I would say that the probability of a public power district later condemning that generator would be essentially zero. Even if they did condemn it, they would certainly have to pay the generator fair market value and probably assume the risk of operating it--and that scenario seems highly unlikely to me. Therefore, I do not see this unlikely scenario precluding private wind energy development in Nebraska. "

Post Response B.

(Post Response A requested two questions to be answered from an entity. This letter is a response to the two questions asked in Post Response A from a person at the recommended entity.)

I received your letter in which you asked two questions relating to condemnation of generation facilities. You asked me to respond via e-mail. Below are the two questions, with my thoughts.

1) Does the condemnation statute apply to generators that existed at the time that the statute was enacted as well as the new projects that have been approved by the Nebraska Power Review Board (NPRB)?

I would like to first point out the NPRB does not have any jurisdiction over condemnation proceedings. Thus, I am not an expert on issues relating to condemnation. It is my understanding that a governmental entity can bring condemnation proceedings against any property so long as the taking was for a valid purpose, such as a public use like a road or governmental building. The question refers to when "the statute" was enacted, but I am not sure whether the statute being referenced is a condemnation statute or the statutes creating the NPRB. If the governmental entity has eminent domain powers and is going to put the property to a public use, I do not think it matters when the generator was built in relation to when either statute was enacted.

2) If both the public power district and the NPRB agreed that having a private developer build a wind energy facility was in the best interest of the public, and it was approved by the NPRB, then the generator could still be condemned?

Again, the NPRB deals with approval of generation and transmission facilities, and not with the condemnation authority of Nebraska's public power utilities. Having said that, I am not aware that obtaining NPRB approval for a facility confers any protections against condemnation. If the NPRB approves a facility and the local power supplier does not object to the generation facility being built, I do not believe either of those actions precludes a public power district or municipality from later exercising its condemnation rights. Perhaps the public power district or a municipality could contractually agree to not exercise those rights.

I would like to also address a couple of issues raised in the e-mail message you received and included in your letter. The writer states that "It is my understanding that before a private developer could build a generator in the service area of a public power district that the power district would sign a waiver agreeing to it." The writer then continues on to ask the question paraphrased as question #2 above. The process is a little different than the writer's understanding. When any entity files an application to construct a generation facility, the NPRB provides written notice to all potentially interested power suppliers. That normally means any power supplier with generation within at least fifty miles is provided notice. The local retail power supplier is notified, also. The power suppliers receiving notice can either file an objection or protest, or they can ignore the application and allow the NPRB to consider whether the proposed facility meets the statutory criteria for approval. As stated above, I am not aware that either the NPRB's approval or the local power supplier's decision to not object to the construction provide any protections against a subsequent valid action to condemn the generation facility. I would certainly agree with the writer that if a generation facility were condemned, the acquiring public power district would have to pay fair market value for it, and would then assume the obligation of operating the facility. The waiver provisions come into play when a power supplier is going to build a transmission line or acquire a customer inside another power supplier's service area. If the power supplier holding the service area rights where the line or customer is located signs a waiver, no hearing is required.

I hope the above information is helpful. Please understand that the above opinions are my personal responses to the questions posed in your letter. The Power Review Board itself has not reviewed them or approved them as the Board's official position.

Post Response C

The Production Tax Credit is 1.8 cents/kWh but is inflation adjusted which means it's about 1.9 cents presently.

Your quote from Thomas Edison is an appropriate one. You might find this story of some interest in that regard. When I was a **** volunteer working for the ***** as a renewables guy back in the late 70s, I got called to do jury duty in ****. During a lunch break I walked the downtown area and noted a *** Windmill Co. sign in the window of an old building. So I went in. **** were still running the store although both were about retirement age.

When I mentioned my own activities in wind energy, *** said that **'s father was interested in wind-electrics and that they had a pile of papers from that era. They pulled them out of a pigeon hole and put them in a box for me to take along and look at. When I got home with them I found a wealth of old brochures and letters. Winpower, Hebco, Lincoln, Parris-Dunn, you name them.

Along with the brochures were two letters from Thomas Edison's office and his Improved Battery company. They were interested in the prospects of using wind-electrics to power electric cars on farmsteads. Imagine an old Baker electric car connected up on a farm to a Hebco windplant. Certainly seems reasonable enough.

Thomas Edison in his Baker Electric Car http://www.eaaev.org/History/images/FamousEVers/edison1.jpg

Hebco Advertisement Pour la Saskatchewan http://www.societehisto.com/Musee/Recits/Photos/generateur.jpg http://www.societehisto.com/Musee/Recits/ouinechargeurs.html

The idea that public power is an inherent barrier to wind energy development is not so. All you have to do is look at the public utilities like the Sacramento Municipal Utility District (SMUD) in Sacramento, CA or the Austin Energy in Austin, TX to see that this is simply not the case.

Both utilities have taken very pro-active positions on the use of conservation and renewables like wind as part of their energy strategy. Most noteworthy is SMUDs shutting down of their troubled nuclear power plant, Rancho Seco, and the placement of a large array of photovoltaic panels and a gas-powered plant on the grounds.

http://en.wikipedia.org/wiki/Rancho_Seco
http://en.wikipedia.org/wiki/Sacramento_Municipal_Utility_District

Regarding the cost-competitive nature of wind verses traditional sources of energy, this depends a great deal on what data is included. While there is a subsidy for wind energy development, it's not as if the nuclear and coal industry do not have their own very significant subsidy programs.

The Price-Anderson Act was set up to help insure a fledgling nuclear industry. Now that the technology has matured and safety issues are much better understood, the taxpayer provided federal insurance benefit continues.

Some have estimated the total taxpayer subsidy to the nuclear industry at $7.1 billion per year back in 1996. Another study notes that of approximately $150 billion in cumulative Federal subsidies for nuclear, wind and solar over about 50 years, 95% of those funds supported nuclear power.

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Post Response C, continued from previous page

Nuclear Subsidies: $7.1 Billion a Year http://www.thirdworldtraveler.com/Corporate_Welfare/Nuclear_Subsidies.html

Federal Energy Subsidies: Not All Technologies are Created Equal http://repp.org/repp_pubs/pdf/subsidies.pdf

If these are close to correct, one might reasonably question how much longer this industry will require such huge subsidies. Is it truly as a reliable and cost-effective option for future supply as many are saying today?

Regarding the cost of new supplies, the idea that the conventional fuels are going to be the least cost sources of electricity is not a certainty by any means.

There is the MIT study on the "Future of Nuclear Power" and Amory Lovin's work (at the Rocky Mountain Institute) on least cost energy options and distributed generation both seem relevant. MIT is obviously a well known and reputable technical institution and RMI has been hired by NPPD for consulting so their credibility shouldn't be particularly suspect either.

In particular, the comparative power costs graphic on page 17 of 180 in the MIT report and Figure 4, "Nuclear power's fatal competitors", on page 7 of 10 in the Lovin's analysis. Links to both references noted below.

The Future of Nuclear Power: An Interdisciplinary MIT Study http://web.mit.edu/nuclearpower/ http://web.mit.edu/nuclearpower/pdf/nuclearpower-full.pdf

"Bigger than Nuclear" - Amory Lovins http://tinyurl.com/njabv http://www.mtpc.org/renewableenergy/public_policy/DG/resources/2005-11-05_Lovins_CHP-DG-BiggerThanNuclear.pdf

Recently increased demands on nuclear fuel along with reduced decommissioning of nuclear weapons into fuel have increased the price of uranium oxide from $6.70 a pound in 2001 to $41.50 in May of 2006.

Price of Uranium Soars - Guardian UK http://www.guardian.co.uk/nuclear/article/0,,1777281,00.html

One final item is the analysis by researchers at Stanford that indicate that wind power is less expensive than coal over 24% of the United States.

Harnessing the Wind: One-Quarter of United States is Suited for Wind Power Production, Researchers Find http://news-service.stanford.edu/news/2003/may21/wind-521.html

Regarding the continuing debate on capacity factors and how to best analyze the reliability of wind as a resource, I would recommend examining the web page that Paul Gipe has provided on the topic and the associated references. Things are not always as they seem with the reliability of wind given the Relative Capacity Credit information that he references.

Grid Integration of Wind Energy - April, 2006 http://www.wind-works.org/articles/GridIntegrationofWindEnergy.html

It is my understanding that the Ainsworth wind farm was slightly above the least-cost value which resulted in a split, but affirmative, vote by the Power Review Board.

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Post Response C, continued from previous page

The ability of small renewable energy producers to be able to market their small but potentially significant renewable energy credits would be very helpful to that sector. If the state could ease this process, that would be a step in the right direction to making smaller projects more cost-effective.

There has been some discussion of so-called "supergrids" to connect various wind farms together over wide areas. Airtricity has proposed such a system in Europe and I've heard that there have been some discussions of such developments in the USA but don't have more detail than that available.

Airtricity - Supergrid http://www.airtricity.com/development/wind_farms/supergrid/

The issue of curtailment fees to wind farms that are on fully loaded transmission lines is an issue that needs to be noted along with the issue of transmission lines themselves. Curtailment was one of the reasons that the California wind farms could not help the consumers in their state when the state energy crisis hit some years ago.

Silence of the Fans in Insane Power Struggle - Sydney Morning News (Australia) http://www.commondreams.org/headlines01/0331-01.htm

Also recently there has been some rather negative press about wind farms in Minnesota getting curtailment fees from Xcel for a similar situation.

Documents: Xcel Customers Pay for Wind Energy Not Produced http://www.grandforks.com/mld/grandforks/news/state/14725122.htm

Denmark sometimes has 100% of their electricity provided by wind power during windy low load conditions. See the reference in our PowerPoint on that for more details.

Hawaii has installed an electrical "shock absorber" made out of battery like ultracapacitors to help smooth out the variations in wind power on their very constrained grids. So far, the reports have been very positive.

Newly Invented Electronic Shock Absorber will give Big Boost to Hawaii Wind Farm http://www.heco.com/images/pdf/ESA.pdf

Device Aims to Smooth Power Plans on Big Island http://starbulletin.com/2006/01/17/news/story05.html

Regarding the timing of winds, I had a hard time believing that the wind tends to blow more in the summer months than it does in the winter as one item noted. So I took the airport data available on-line that had monthly averages, put them on an Exel sheet and charted them. According to this data, there generally tends to be a peak in April and a low point in August. Note attachment.

One program that other areas have used to encourage small wind development is to start up anemometer loan programs. This allows for inexpensive wind measurement for folks who are interested in a wind installation but don't want to pay for a complete measurement system to do so.

Oregon's Anemometer Loan Program http://me.oregonstate.edu/alp/

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Post Response C, continued from previous page

North Carolina's Anemometer Loan Program http://www.wind.appstate.edu/swiwind/alp.php

Development of wind power in Europe has included two policy approaches to spread the wind power development around. One is that wind systems are often set up in small clusters rather than in large "farms" which reduces the impact of the systems visually and otherwise.

Wind Clusters: Expanding the Market Appeal of Wind Energy Systems http://www.earthscape.org/r1/duj01/duj01.html

Another thing that the Germans have done is to bias their credits in a way that encourages lower wind areas to be developed.

Germany's New Renewable Energy Law http://www.climnet.org/news/EEG.htm

Least cost analysis should also look at the potential for making money by allowing wind systems on the lines and selling it out of the state with the attendant benefits. This is contrary to the focus on just the load growth within the state. One concern is if regional city and industrial loads will be allocated to other wind farms in neighboring states before we can get off the dime.

Wind resource references should provide not only the wind speeds noted but also the height at which they are noted. This is an important piece of information to include with such references.

As a point of information, it should be noted that the New York Times has written that the "Center for Science and Public Policy" is an organization which has funding from Exxon Mobil.

Exxon Backs Groups that Question Global Warming http://www.libertymatters.org/newsservice/2003/faxback/2482_05-29-03_Warming.htm

AWEA has put out a statement to counter some of the information in the CSPP's "Wind Farms Provide Negligible Useful Electricity".

http://www.ifnotwind.org/pdf/060517_Response_to_Courtney-CSPP.pdf

That's pretty much it for items that I thought should have some extra comments. Hope they are of some help in providing a well-rounded view of the topic and associated issues.

Monthly Wind Averages – Neb.

Source: Wunderground.com

	J	F	M	A	M	J	J	A	S	O	N	D
Valentine – Miller (KVTN)	15	14	17	18	18	16	15	14	15	14	14	14
Scottsbluff – Heilig (KBFF)	19	19	21	21	19	17	15	15	16	16	17	18
Grand Island – Regional (KGRI)	21	21	23	24	22	20	18	18	18	19	20	20
Omaha – Eppley (KOMA)	18	18	20	20	17	16	14	14	15	16	17	17
Lincoln – Municipal (KLNK)	17	18	21	21	19	18	17	16	16	17	17	17
Norfolk – Stefan (KOFK)	20	19	21	21	19	17	16	16	17	18	19	19
North Platte – Bird (KLBF)	16	17	20	22	20	17	16	16	17	16	16	15

Post Response D

I would like to thank you for getting the discussion started on renewable energy.

I thought the meeting 7-14-06 was very well conducted.

As technology advances wind energy will definitely be in the mix at what percent is any ones guess.

I have some comments I would like to share with you. It would be very helpful if you could tour Western Area Power Administration control room in Loveland, Colorado and discuss with them the complexity of the transmission grid, interconnection of the transmission grid, control problems, problems getting right of way for transmission line, how intermitted power can cause blackouts and etc.

The article Wind Farms Provide Negligible Useful Electricity by Richard S, Courtney March 2006, center for science and public policy- Washington D.C. is very interesting. (www.scienceandpolicy.org)

I would think a nuclear plant would better serve the need for economic development and electricity than a wind farm.

Post Response E (from Loup Basin RC & D survey)

Nebraska needs some type of modest but reasonable net metering program. This is necessary to make small renewable energy systems cost effective for development. Small would generally be defined as something less than 50 to 100 kW. The Nebraska Legislature needs to address this issue.

More dialogue with our Public Power Utilities, the Power Review Board, and the State Legislature is needed to develop Power Purchase pricing parameters that allow for sound renewable energy development while still protecting public power and the power consumer. It seems that "avoided costs" should be based to some extent on the cost to generate power from new generating facilities rather than looking just at current generating costs. Changes should recognize that the public is willing to pay some more for renewable energy but certainly not significantly more. Some official group such as a legislative group, the power review board, Nebraska Energy Office, etc, needs to facilitate this discussion, reach some conclusions/concensus, and make strong recommendations to the Power Utilities.

This discussion also needs to include whether Nebraska should have a Renewable Fuels Standard. I believe they should!

The State of Nebraska needs to provide some state incentives/tax credits for these industries in order to be competitive with adjoining states and to facilitate development. The legislature needs to take action on this issue next session.

Nebraska needs to invest more in renewable energy research. A comparison to other states, particularly Kansas where several billion dollars is being invested in technology and renewable energy, demands that the Nebraska Legislature and the University become more aggressive in renewable energy research funding. Research should target actual commercial development of innovative technologies and processes. The research should forge partnerships with innovative businesses and entrepreneurs.

Post Response F (from Loup Basin RC & D survey)

Incentives are needed to encourage the use of solar and wind energy for small-scale private and public projects including photovoltaics, solar panels, solar hot water heaters, wind turbines and other applications.

Neighborhood and community installations of small-scale wind turbines in a park or common area to spread the costs on a broader base than just individual homeowner. For example, install wind turbine in a neighborhood or a location within a community and use existing power lines to transmit electricity to a neighborhood or a small community.

Education programs to dispel the attitudes or reasons why people are reluctant to move toward solar and wind energy. For example, danger to wildlife, noise from wind turbines (there are quiet turbines these days)

Although Nebraska is a public power state and our power rates may be lower than other states, a law should be passed allowing net metering as an encouragement to people who would install solar or wind energy systems on the property or within their community.

Post Response G

I see on pages 11 and 12 in one of the shaded boxes that the Power Review Board is referred to as the "Public Power Review Board." Although this is a common misunderstanding, there is no "Public" in the agency's name. The current laws pertaining to generation and transmission administered by the PRB apply equally to public and private entities engaged in generation and transmission activities

I appreciate your decision to withhold the identities of the people providing responses, but I wanted to offer that if you believe it would be helpful or lend credibility to the information, you could reveal that I was the author of "Post Response B" on page 77. I was acting in my official capacity as PRB executive director and general counsel when I wrote it, and it is a public record. I think anyone connected with the industry would certainly know that I wrote Post Response B, anyway. It doesn't matter to me, but I wanted to offer that to you.

Thanks again,
Timothy J. Texel
Executive Director and General Counsel
Nebraska Power Review Board