Appendix E:

Assessment of Renewable Wind Resources As Part of KCP&L's Supply Portfolio

KANSAS CITY POWER & LIGHT

Energy Resource Management

December 1, 2004

HIGHLY CONFIDENTIAL

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1.0 Executive Summary

Overview

As part of the KCP&L Strategic Planning Process, KCP&L assessed renewable energy resources as a part of the supply portfolio. A preliminary technology review indicated that, of the currently viable renewable technologies, large-scale wind generation was the most practical and economic renewable resource readily available on a meaningful scale for serving KCP&L customers. The addition of wind generation to the KCP&L generation portfolio has been proposed as part of KCP&L's overall Comprehensive Plan for meeting the future generating needs to serve its customers.

Wind is currently a consideration for many reasons. World-wide increasing demand for emissions-free generation has created a social awareness and interest in moving toward renewable generating resources as part of the next generation's supply portfolios. Wind development has been a focus internationally over the past 10 years and such focus on development of wind resources has resulted in an evolution of wind turbine generator technology and improved manufacturing economies through increased utilization of capacity, R&D and other fixed cost items. Technology improvements provide greater capacity factors as newer turbines are capable of generating through a wider range of wind speeds than earlier turbines. Turbine generator capacity has increased to a standard of 1.5 MW or more per turbine, allowing more generation at a given site and driving down the installation cost on a $/kW basis. Increased operating experience has driven down the O&M costs of maintaining wind farms.

Even with these improvements in technology and reductions in cost, wind still relies on the Production Tax Credit (PTC) to subsidize the higher costs of wind resources. Without the PTC, under base case assumptions, wind generation is not competitive with base load coal fired generating resources on a stand-alone busbar cost basis.

However, under sensitivity cases where more stringent environmental regulations would impose greater costs and restrictions on coal-fired generation, wind is shown to provide value through mitigating the risks of higher costs imposed on consumers in these scenarios. Natural gas fuel price volatility is also somewhat mitigated with the addition of wind generation in the supply portfolio. Potential restrictions of greenhouse gas (GHG) emissions are an additional risk that is mitigated by the installation of wind generation. The addition of wind to KCP&L's portfolio will help meet our voluntary obligation to reduce CO_2 emission intensity on a Lbs/MWh basis under the DOE/EEI Power Partners Program. This obligation is documented in KCP&L's memo of understanding with EEI to reduce carbon intensity, which is an industry effort to support President's Bush's voluntary approach to controlling GHG's.

As KCP&L currently does not have experience with incorporating wind into its generation portfolio, the initial investment in wind is planned to be a 100 MW project that will enable KCP&L to gain operations and maintenance from. Currently there are many operational uncertainties that KCP&L will face once a wind resource is added to its generation fleet.

The potential requirement for a Renewable Portfolio Standard (RPS) is another driver for the consideration of wind generating resources. To date, 27 states have passed RPS legislation or have implemented regulatory rulings requiring a percentage of annual utility generation to come from renewable resources. Similar proposals have been made but not passed at the Federal level. Installing renewable resources ahead of forced RPS requirements should provide protection against higher prices that would be expected from a rapid increased demand in sites and turbines.

There is also a growing customer and societal interest in seeing the development renewable resources due to a growing customer and community awareness of environmental issues and the environmental benefits of renewable generation. A final driver for investigating the addition of wind resources is KCP&L's location. The State of Kansas is recognized as being in the top five wind resource states in the United States and numerous large-scale wind sites in advanced development are available within the

proposed Southwest Power Pool (SPP) Regional Transmission Operator (RTO) footprint.

Summary

Wind generation under current environmental regulations without the support of the Production Tax Credit or other federal or state subsidy is not cost competitive with other traditional forms of base load generation. However, when taking into consideration the high probability of more stringent environmental regulations around coal fired generation and imposed mandates for renewable energy, the inclusion of wind generation in a balanced portfolio provides risk mitigation, which will ultimately yield lower costs for consumers. The addition of wind generation is consistent with KCP&L's strategic goal to remain a good corporate citizen with our community and to continue to provide electricity services to our customers in an economic and environmentally responsible manner.

2.0 Issues Driving the Consideration for Renewable Resources

Environmental Issues

Perhaps the greatest area of risk mitigation associated with wind is the potential for mandated reductions in CO_2 emission levels. Much of Europe has already signed the Kyoto treaty. Russia has also signed the treaty. There is growing public concern over the global warming issue. Some states have moved to impose their own CO_2 restrictions. The following states have enacted limits on greenhouse gasses or have proposed limits on greenhouse gases. The states are Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York and Oregon. Other states, that include California, Georgia, Minnesota Nebraska, North Carolina and Texas, have various programs in place that serve to limit other sources of greenhouse gases, other than electrical generating facilities. There has been a growing interest in Congress and the White House to address increased pressure from a number of environmental interests to address this issue. Over the past several years several bills have been introduced in Congress that would require the reduction in CO_2 emissions. Although the Bush administration has indicated a desire to avoid more drastic reductions without scientific evidence to support such reductions, there is a potential that future reductions in CO_2 emissions will be mandated.

The expected form of regulation would include a CO_2 cap and trade market similar to the market in Europe. The cost impacts of such regulation can be seen by looking at the impact of a $1/ton "tax" (allowance cost) on CO_2. For traditional generating technologies, such a tax could equate to:

- Coal with a 10,000 Btu/kWh heat rate = $1.00/MWh
- Combined Cycle with a 7,200 heat rate = $0.43/MWh
- Combustion Turbine with a 12,000 heat rate =$0.71/MWh

Forecasts for the price of CO_2 allowances vary greatly depending on the assumptions utilized to produce the forecast. In AEP's August 31, 2004 report titled "An Assessment

of AEP's Actions to Mitigate the Economic Impacts of Emissions Policies", CO_2 prices were forecast from a low of $4/ton in 2010, to a high of $37/ton in 2020. The potential impacts of these costs are avoided with wind generation.

Financial Incentives For Wind

The Renewable Energy Production Tax Credit (PTC) was extended on September 23, 2004 as part of an H.R. 1308. The PTC was made retroactive to the beginning of 2004 and will extend through the end of 2005. The PTC version that was passed in H.R.1308 calls for the equivalent of $18.00/MWh tax credit to be applied to electricity generated by renewable sources, such as wind. This credit is to be adjusted annually for inflation and will last for a period of 10 years from the in-service date.

An extension of the PTC beyond the end of 2005 is highly uncertain and if extended, future legislation supporting the continuation of a PTC could provide different incentive structure than the structure currently in place. For modeling purposes for the scenarios, which include an assumed extension of the PTC beyond 2005, keeps the PTC at a fixed $18/MWh without an annual inflation adjustment. This assumption is the structure that was proposed in HR 4520 An extension would have a significant impact on the cost to install wind generation as contained in the Comprehensive Plan. The $18/MWh tax credit can provide revenue benefits up to $29.50/MWh, taking into account the income tax affects if, as expected, revenue levels allow full use of the tax credits. This obviously has a significant impact on the economics of wind generation. With the PTC extension, the inclusion of wind resources provides marginally economic benefit under the base case assumptions before consideration of the risk mitigation provided by wind. Without the PTC extension, the risk mitigation provided by wind generation for future environmental regulations becomes the driver to pursue this resource.

The State of Kansas currently allows a return on wind investments that is 1.5% greater than allowed for fossil fuel generation investments. In addition to this return on

investments, Kansas provides property tax incentives on wind projects. Because of the other uncertainties involved with a total cost of service rate case, these incentives were not considered in this evaluation.

Technology Development Status

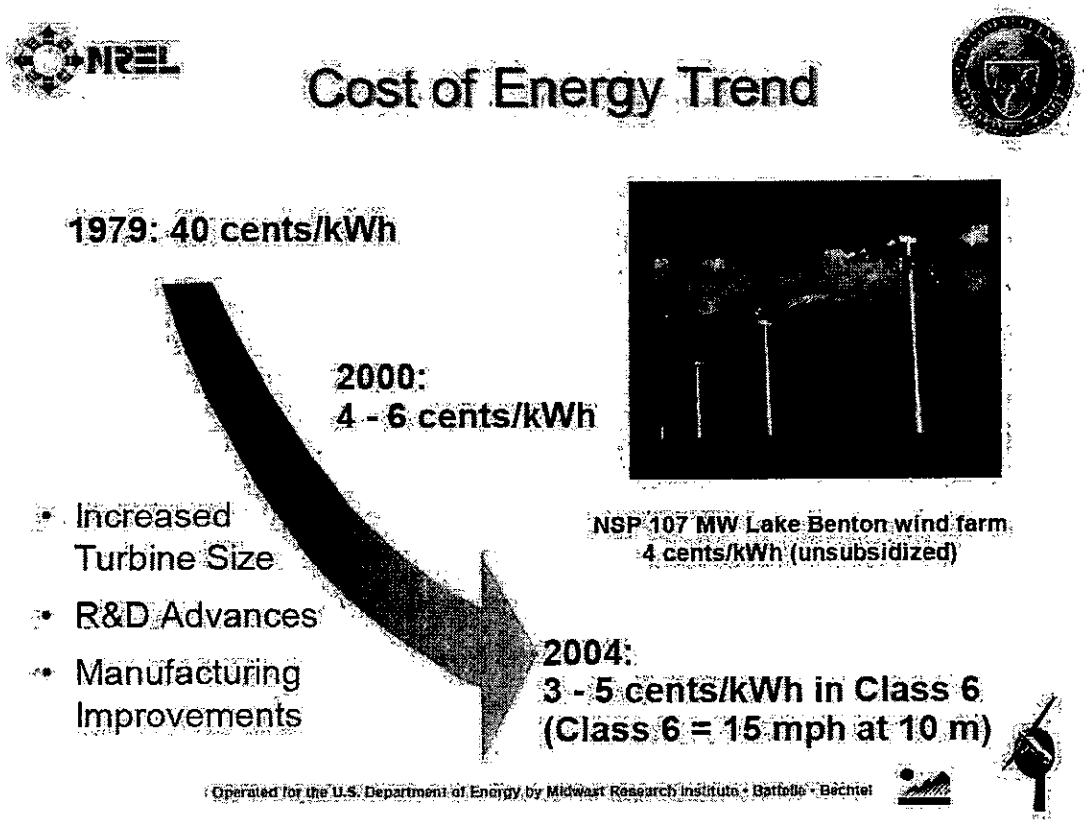
Wind generation technologies have been advancing at a fast pace for the past 10 years. As a result, wind turbine technology has improved with regard to size and efficiency. These changes mean that wind energy development from regions once considered to have insufficient wind speeds for wind generation is now feasible. Where early wind turbines were once only capable of generating less than 100 kW of power, newer wind turbines are routinely capable of generating up to 2.5 MW in land-based locations and over 3.0 MW in offshore locations. Currently the limiting factor for land-based generation is the size of the blades. The length of individual blades, approaching 150 feet from hub to tip, has created highway transportation issues.

Early wind turbine tower designs incorporated an open lattice framework. Unfortunately these open support structures provided good perches for large birds that could fly into spinning turbine blades. Current wind turbine technology now incorporates enclosed tubular support towers, which do not provide places for birds to perch. Besides the support structures, some of the earlier wind turbine designs required the blades to spin at a higher speeds in order to generate usable quantities of electricity. New blade designs allow for the turbines to operate at much lower rotational speeds and still capture usable quantities of electricity. Lower rotational speeds reduce the potential for bird impacts with the blades.

The technological advances have come about as a result of larger and well-established manufacturers, such General Electric and Vestas, entering the market. These companies, as well as others, have invested heavily in wind turbine technology to overcome problems associated with earlier designs. Other advances have evolved with

improved generation controls systems to diminish the impact of wind generation on the nation's electrical transmission system. Depending upon the manufacture, VAR support is provided either through electronic controls within the generators controls or with the addition of capacitor banks that are part of the collection system, which aggregates the output from multiple generators before the energy, is transmitted to the transmission interconnection substation. The continuing development of wind turbines has lead to less expensive and more reliable generation equipment and systems.

The following table, from the National Renewable Energy Laboratory illustrates the evolution of technology improvements and the impact those improvements have had on the cost of wind generation.



General Public Interest and Awareness

Energy independence is a common political theme and is increasingly viewed as a desirable goal for the American economy. Reducing the United States' dependence on foreign oil and other forms of energy has become increasingly viewed as a priority among the American public.

Environmental awareness is also growing. Despite the fact that the air quality in the United States has been steadily improving, consumers are becoming increasingly more concerned of potential threats from air emissions and perceive a strong need to continually improve air quality.

KCP&L customer surveys indicate a general interest in having wind as part of an overall portfolio of supply resources. Of the customers surveyed, 42% expressed an interest in a green (renewable) power product. Nationally, green product penetration for residential customers averages 3-5%. In addition to residential customers, there are some progressive commercial and industrial customers that have expressed an interest in green power as a part of corporate initiatives. Other customer segments, such as schools and hospitals have expressed a strong interest in green power. Further interest in green power has come from the Federal Government in that the Department of Energy has mandated that Federal Governmental facilities must procure 5% of their overall electrical needs from renewable resources wherever possible. Many corporations have adopted "green policies", which require them to meet a percentage of energy use through renewables. Where renewable energy is not available, these corporations purchase green certificates. With rising customer awareness of environmental issues there is an indication that a wind resource investment may be more favorably received as part of an overall portfolio solution across the rates.

Interest From Governmental Agencies

In Missouri, the Missouri Department of Natural Resources (MDNR) has shown an interest in the addition of renewable energy resources in the State. Preliminary research done by the MDNR has identified areas in the State that potentially could provide economic wind energy. Additional research and meteorological data collection would be required over several years to confirm this.

The State of Kansas has had a high interest in the development of wind energy resources and has several State agencies and task forces assembled to address issues raised with the development of wind energy. The Wind and Prairie Task Force was assembled to review the issues around wind generation in Kansas, especially the Tallgrass Prairie region of the Flint Hills. This work has been succeeded by the Kansas Energy Council, which has been assembled by the Governor's Office to develop a comprehensive energy plan for the state of Kansas and to address policy issues with the development and use of wind energy as an abundant Kansas Energy resource.

3.0 Site Issues and Site Development

Development of wind farm sites is a more involved process than one might imagine. The primary needs are easily established: significant landmass for economies of scale, adequate wind regime to support an economic capacity factor, and transmission access within an economic distance. Numerous sites would meet these general criteria, however, significant detailed evaluations are required to fully validate the quality of these requirements. KCP&L has been working with a number of wind development firms whose expertise is to understand and address issues specifically related to wind development. It is KCP&L's intent that any prospective project considered by the Company for wind development will be non-controversial and be viewed favorably by landowners as well as state and local government entities.

Typical developmental needs are discussed below.

Site Environmental Issues and Permitting Requirements

- Tallgrass Prairie/Flint Hills Issues - In Kansas some to the best sites for Wind generation are in the Flint Hills region. The Flint Hills have some of the last intact sections of the Tallgrass Prairie in the United States. As a result, there has been pressure from some groups within Kansas to ban development of Wind generation within this region. The Wind and Prairie Task Force now succeeded by the Kansas Energy Council has been delegated the responsibility of developing principles, guidelines, and tools that local entities can use as they address the issues concerning wind-energy development in the Flint Hills and other environmentally sensitive areas. The Kansas Governor's office is studying a recommendation made by the Energy Council which would restrict wind development in a specific area of the Flint Hills for the protection of the Tallgrass Prairie.

- Impact on Endangered Species - Several of the choice Wind generating sites in Kansas are inhabited by the Prairie Chicken. As a result, the wind developers in Kansas have undertaken to carefully study each site and to evaluate any impacts on the Prairie Chicken or other endangered species.
- Bird Impingement - To avoid some of the early issues faced in California regarding avian deaths, the wind developers in Kansas have taken steps to address these issues. Sites are carefully studied to evaluate the various species of birds present or to evaluate any possible migratory flyways, which could be impacted by Wind generation at the sites.
- Visual - Due to the height of the wind turbines, visual impacts are very much a concern of local residents and local permitting agencies. Some of the counties in the Kansas Flint Hills region that may have sites for Wind generation are in the process of establishing rules regarding visual impacts of the turbines.
- Archeological Survey - As with any generation related construction project in Kansas, surveys must be undertaken to insure that the potential Wind generation sites do not have archeological significance. As part of the permitting process the sites in question must be surveyed and the results of the survey filed with the appropriate agency in Kansas.
- Electrical Transmission - In addition to obtaining all federal, state and local permits for the actual generation sites, permits and right-of-ways for electrical transmission lines, to deliver the electricity to the customer, must also be obtained.

Public Acceptance

Public acceptance for Wind generation within Kansas is often varied.

- Tallgrass Prairie/Flint Hills - In regions around and in the Tallgrass Prairie/Flint Hills region, there has been a mixed reaction. Landowners who stand to gain from siting of Wind generation on their land and those who are sensitive to land owners rights issues have expressed an acceptance to Wind generation. In the

same region, there are some who do not want the region disturbed in any fashion by the installation of wind turbines. Efforts are underway through the Kansas Energy Council and the Kansas Governor's office to provide further guidance for development of wind resources within this region.

- Regions Other Than Flint Hills - In the areas outside of the Tallgrass Prairie/Flint Hills region, the public has been very supportive of Wind generation development. Wind development in these regions is recognized as both an environmentally friendly method of generating electricity and as a potential economic benefit to the counties and communities.

Wind Data Collection

To fully understand the development potential of any site, extensive metrological studies have to be undertaken. Typically, metrological data gathering towers are installed at multiple locations around potential sites. The towers have data gathering equipment at various heights so that wind speed, wind energy and wind direction can be recorded. Most sites under consideration have multiple years of data collected. In addition to on-site data collection, records are collected from surrounding air port and/or governmental metrological data centers. Once adequate data has been collected it is analyzed to determine a site's Wind generation potential. Wind developers typically hire third parties to analyze the data and issue a certified site capability report. The results of these reports play a critical role in the economics of individual sites because they indicate the expected seasonal generation from each site. The economics of wind generation are highly sensitive to the expected capacity factor.

Transmission Studies

The cost of transmitting energy from the wind facility to the designated load is another significant economic consideration for selection of preferred wind sites. To determine the actual cost associated with transmission, two studies are required from SPP. The first is an interconnection study that indicates the capital improvements required to

interconnect a generating facility to the grid. The second study indicates the line losses and costs associated with actual delivery from the generating source to the desired load. Most sites in advanced development have obtained the interconnection study; however, there are no known sites with delivery studies to the KCPL system. In the absence of these studies, the cost of transmission can be estimated based on historic results from previous generating additions. If estimates are used in economic evaluations, it is important to include sensitivity analysis to ensure the potential range of costs are included. Preliminary studies indicate that the capacity factor of a wind site has a significantly larger impact on the economics than the cost of transmission. From an operational standpoint, KCP&L selected 100 MW as the size of the first installment of wind due to transmission and operational uncertainties. Unknown factors such as how wind generation will impact the dispatch of other resources within KCP&L's Energy Management System (EMS) and how the variability of wind generation will affect the transmission system and the generation facilities within the control area where the wind facility will be located are two of the primary reasons for limiting the size of the first wind facility.

Site Development Progress

The sites under consideration by KCP&L are in advanced stages of development within the state of Kansas. All have, or shortly will have, all the federal, state and local permits in place for development. At least one full year of metrological data will have been collected for all sites under consideration. These sites potentially could be developed by the end of 2006. There are some other sites within the state of Kansas that are not as far down the development path, but may be ready for a 2008 on-line date. Sites within Missouri are in the very preliminary stages of being identified and data collected. Sites in Missouri are not sufficiently developed at this time to consider a Missouri site for the 2006 wind installment. There is some potential that a Missouri site could support wind generation resources for the proposed 2008 installment.

Site Development and Developer Capabilities

In addition to the site development issues discussed previously, the experience of the site developer is an important consideration. Site developers that have solid experience behind them and have access to wind turbines, transformers and related equipment are viewed by KCP&L in a more favorable light. The primary sites under consideration by KCP&L are being developed by entities that have several successful Wind generation sites in their development portfolio. Due to the PTC being reauthorized for projects completed through the end of 2005, the demand for turbines and related equipment has created shortages of equipment and construction contractors and driven up the price of turbine generators and materials making a 2005 project completion unlikely.

4.0 Economic Assessment

Capital Cost Assumptions

Cost data for wind generation projects was gathered from numerous developers. Recently, the cost projections have shown an increase from costs provided several months ago. Although the price of steel has contributed to the price increase, a more significant impact is associated with the recent passage of an extension to the PTC through December 2005. The short-term extension has driven demand for the wind generation equipment, construction equipment, construction expertise, and preferred sites able to accommodate development by the end of 2005. Expected installed costs are shown in the table below. Both earlier price estimates and the more recent price estimates are shown to demonstrate the price impact of high demand.

Installed Cost of Wind Generation: 100 MW ($/kW)			
	Low	Expected	High
Early Wind Costs	$ 1,120	$ 1,170	$ 1,320
Late 2004 Wind Costs	$ 1,143	$ 1,373	$ 1,488

The early wind costs, provided in 2003, include $15 million for transmission interconnection and upgrades. For the later pricing, transmission costs are included at $5 million in the low case, $10 million in the expected case and $15 million in the high case. The "Late 2004 Wind Costs" in the above table constitute the **Base Case** for the wind evaluations. Additional Wind Cost data is shown in the table below.

Wind Installed & Operating Cost Estimates (100 MW)					
Source	Installed Cost	Transmission	AFUDC		Fixed O&M
EIA 2004					$/kW-Yr
$/kW	$ 1,130	$ 100	$ 46	**$ 1,276**	$ 29.40
Total $'s	$ 113,000,000	$ 10,000,000	$ 4,600,000		
EIA 2004					
$/kW	$ 1,130	$ 150	$ 47	**$ 1,327**	$ 29.40
Total $'s	$ 113,000,000	$ 15,000,000	$ 4,700,000		
EPRI 2003					
$/kW	**$ 1,238**	No Licensing, Permits, Development			
Developer #1					
$/kW	**$ 1,300**				$ 32.00
Burns & McD		Midwest	Upper Midwest	Northeast	
Capacity	(kW)	50,000	50,000	50,000	
Number of Generators	(No.)	33	33	33	
Capital Cost	($/kW)	**$1,326**	**$1,195**	**$1,500**	
Fixed O&M	($/kW-yr)	$33.00	$33.00	$33.00	

Fixed O & M Assumptions

The O & M for a wind facility is considered to be completely a fixed cost. Traditionally, in a fossil fuel facility, much of the variable O & M is attributed to fuel costs with a lesser degree due to consumables. For modeling purposes the assumption was made that an

annual extended warranty would be purchased for each turbine as well as an annual O & M contract with a third party. The extended warranty and the O & M contract would provide for all O & M costs for the wind facility. Also included in the fixed O & M costs are general costs such as insurance, KCP&L personnel and any other annual taxes and fees.

Accredited Capacity

Currently the Southwest Power Pool does not have any accreditation rules in place regarding wind generation facilities. This issue is currently under study within the Southwest Power Pool. Southwest Power Pool Generation Working Group issued a White Paper at the October 27, 2004 Board Of Directors/Members Committee Meeting that addressed wind facility accreditation. Using the methodology outlined in the White Paper, the prospective sites under consideration by KCP&L could be accredited at approximately 7%. For modeling purposes, the 7% accreditation factor was used.

Capacity Factor

For modeling purposes, a representative daily on-peak and off-peak capacity factor wind data table was employed. This table was representative of several that were supplied by various wind developers. Sensitivities around this data were employed to measure the impact of capacity factor on the PVRR for the various scenarios.

Ancillary Services

Ancillary services such as spinning reserve, transmission losses, load following and regulation reserves are services that will have to be supplied when a wind facility is connected to the transmission network. As wind is a relatively new and limited generation resource in the United States, the cost of providing ancillary services is and has been studied on various systems. The following table is taken from a report entitled "WIND POWER IMPACTS ON ELECTRIC POWER SYSTEM OPERATING COSTS: SUMMARY AND PERSPECTIVE ON WORK TO DATE" presented by representatives

from the National Renewable Energy Laboratory, Utility Wind Interest Group and Renewable Energy Consulting Services Inc. As the table indicates, the cost of ancillary services can vary as a result of the interconnected systems' characteristics, the relative wind penetration and overall size of the interconnected system. Based upon KCP&L's current accredited capacity of slightly more than 4,000 MW, a 100 MW wind facility would represent approximately 2.5% relative wind penetration and a 200 MW wind facility would represent approximately a 5% relative wind penetration. Since the KCP&L relative wind penetration is predicted to be similar to the UWIG/Xcel study data and the We Energies I study data, the cost of ancillary services was set at $2.00/MWh for modeling purposes.

		$/MWh			
Study	Relative Wind Penetration (%)	Regulation	Load Following	Unit Commitment	Total
UWIG/Xcel	3.5	0	0.41	1.44	1.85
PacifiCorp	20	0	2.50	3.00	5.50
BPA	7	0.19	0.28	1.00 - 1.80	1.47 - 2.27
Hirst	0.06 - 0.12	0.05 - 0.30	0.70 - 2.80	na	na
We Energies I	4	1.12	0.09	0.69	1.90
We Energies II	29	1.02	0.15	1.75	2.92
Great River I	4.3				3.19
Great River II	16.6				4.53
CA RPS Phase I	4	0.17	na	na	na

Transmission Costs

The cost to interconnect to a transmission system and the cost for any transmission upgrades is site specific for each proposed wind facility. While the direct interconnection costs, i.e. new ring bus interconnection, are approximately $5,000,000 , depending upon the interconnection voltage, the transmission system upgrades are much more uncertain without a specific system impact study. For modeling purposes, the direct interconnection costs were included in the capital costs for a new wind facility and $10,000,000 was assigned to any potential transmission system upgrades.

Base Case Assumptions and Alternative Plans

Base case assumptions for adding wind resources to KCP&L's generation portfolio include the following:

- Installed Cost ($/kW) — $1,373 (with $10 million for Transmission)
- Fixed O&M ($/kW-Yr) — $30.00
- Variable O&M ($/MWh) — $0.00
- Quantity (MW) — 100 MW in 2006, 100 MW in 2008
- Ancillary Services ($/MWh) — $2.00 (spinning reserve, transmission losses, etc)
- Accredited Capacity (MW) — 7 MW (Based upon a 100 MW facility)
- CO2 Tax — Increased demand on natural gas generation by a CO2 tax will be accompanied by high gas prices

Alternative Plans

Alternative plans modeled in MIDAS include the following:

- Comprehensive Plan with the base case addition of wind (100 MW in 2006 and 100 MW in 2008)
- Comprehensive Plan with the base case addition of wind (100 MW in 2006 and 100 MW in 2008), but with a 400 MW share of latan-2 rather than 500 MW share
- Comprehensive Plan with only 100 MW of wind in 2006.
- Comprehensive Plan with NO wind
- Comprehensive Plan with a 400 MW share of latan-2 rather than 500 MW share and NO wind

The following table shows the change in PVRR for the alternates listed above using base case assumptions.

Wind Resource Analysis	
PVRR Changes from Comprehensive Plan	
Base Assumptions ($'s in Millions)	
Scenario	**PVRR Change**
500 MW Coal - 100 MW in '06, 100 MW in '08	**0.000**
500 MW Coal - 100 MW in '06	(28.244)
500 MW Coal - No Wind	(67.534)
400 MW Coal - 100 MW in '06, 100 MW in '08	12.520
400 MW Coal - No Wind	(45.047)

Sensitivities

Sensitivities impacting wind resources as modeled in MIDAS include the following:

- Installed cost of wind (based on ranges provided by developers)
- Wind site capacity factors (based on 12 to 36 month wind data provided by developers)
- Installations with and without PTC
- CO2 limitations

RESULTS

Installed Cost

The installed cost of wind will impact the Present Value Revenue Requirements (PVRR) of each scenario. As indicated above, the range of expected capital costs includes $1,143/kW (low), $1,373/kW (base) and $1,488/kW (high). The PVRR impacts are shown in the table below. The change in PVRR from the base cost is the same with and without CO2 limitations. The following table shows the impact the capital cost of

wind has on the PVRR in both the Comprehensive Plan and the Comprehensive Plan with wind in 2006 only.

Wind Capital Cost Sensitivity			
PVRR Changes from Comprehensive Plan ($'s in Millions)			
	Wind Capital Cost		
	Low	Base	High
500 MW Coal - 100 MW in '06, 100 MW in '08	(30.013)	**0.000**	15.007
500 MW Coal - 100 MW in '06	(43.683)	(28.244)	(20.525)
Change due to Capital Cost Only	(15.439)	0.000	7.719

The uncertainty associated with the installed cost of wind resources will change PVRR requirements by $45 million in scenarios with 200 MW of wind, and $23.1 million in scenarios with only 100 MW of wind.

Capacity Factor

The capacity factor associated with wind generation will have a significant impact on the PVRR of each scenario. Based on a minimum of 12 months of wind data for various potential wind farms in advanced stages of development, the low capacity factor is assumed to be 33%, base capacity factor is 38% and the high capacity factor is 43%. The PVRR impact of this range of capacity factors is shown in the table below.

Wind Capacity Factor Sensitivity				
PVRR Changes from Comprehensive Plan ($'s in Millions)				
		Wind Capacity Factor (No PTC)		
Scenario		Low	Base	High
500 MW Coal - 100 MW in '06, 100 MW in '08		18.393	**0.000**	(18.386)
500 MW Coal - 100 MW in '06		(18.564)	(28.244)	(37.921)
	Change due to Capacity Factor Only	9.680	0.000	(9.677)
500 MW Coal - No Wind		(67.534)		

The capacity factor of the selected site can change PVRR of scenarios with 200 MW of wind by $36.8 million with no PTC and up to $56.8 million with PTC applied to all 200 MW of wind. For scenarios with 100 MW of wind, the capacity factor can change PVRR by $19.3 million with no PTC and up to $29.7 million with PTC applied. Under CO2 limitations and a 200 MW wind installation, capacity factors can change PVRR between $45.4 million and $65.5 million depending on PTC availability for 200 MW projects. With CO2 limitations for a 100 MW installation the change in PVRR could range from $24 million to $47 million depending on PTC availability.

Production Tax Credit (PTC)

The impact of the PTC was also modeled as a sensitivity. The table below shows the PVRR impact on each scenario under three PTC sensitivities, 1) no PTC extension, 2) PTC extended through In-Service dates of December 31, 2006, and 3) PTC extended through In-Service dates of December 31, 2008.

PTC Availability Sensitivity			
PVRR Changes from Comprehensive Plan ($'s in Millions)			
	Production Tax Credit Availability (In-Service Year)		
Scenario	Thru 2005	Thru 2006	Thru 2008
500 MW Coal - 100 MW in '06, 100 MW in '08	**0.000**	(59.984)	(93.418)
500 MW Coal - 100 MW in '06	(28.244)	(88.228)	
Change due to PTC Only		(59.984)	
400 MW Coal - 100 MW in '06, 100 MW in '08	12.520	(47.467)	(80.899)
Change due to PTC Only		(59.987)	(93.419)
500 MW Coal - No Wind	(67.534)		
400 MW Coal - No Wind	(45.047)		

The PTC has an obvious impact on the value of wind resources. In the Comprehensive Plan, PTC will reduce PVRR by $60 million to $93 million depending on the amount of wind covered by PTC. The benefit of having the PTC extended through 2006 has nearly the same effect as the elimination of the wind from the Comprehensive Plan.

Production Tax Credit (PTC) and Capacity Factor

The following table shows the impact of the combination of the capacity factor sensitivity and the availability of the PTC.

Wind Sensitivity - Capacity Factor and PTC			
PVRR Changes from Comprehensive Plan ($'s in Millions)			
	Production Tax Credit Availability (In-Service Year)		
Scenario	Thru 2005	Thru 2006	Thru 2008
500 MW Coal - 100 MW in '06, 100 MW in '08			
Base Capacity Factor	**0.000**	(59.984)	(93.418)
Low Capacity Factor	18.393	(36.423)	(64.988)
High Capacity Factor	(18.386)	(83.536)	(121.835)
500 MW Coal - 100 MW in '06			
Base Capacity Factor	(28.244)	(88.228)	
Low Capacity Factor	(18.564)	(73.380)	
High Capacity Factor	(37.921)	(103.074)	
400 MW Coal - 100 MW in '06, 100 MW in '08			
Base Capacity Factor	12.520	(47.467)	(80.899)
Low Capacity Factor	30.950	(23.869)	(52.432)
High Capacity Factor	(5.904)	(71.057)	(109.357)
500 MW Coal - No Wind	(67.534)		
400 MW Coal - No Wind	(45.047)		

The above illustrates that having a high capacity factor in the Comprehensive Plan with the availability of the PTC more than offsets the PVRR impact of the Comprehensive Plan without wind.

CO2 Limitations

The following table shows the effect of the imposition of a CO2 tax on the PVRR in the indicated scenarios. The CO2 tax limits would apply to all KCP&L existing and new generation.

Wind Sensitivity - CO2 Tax			
PVRR Change from Comprehensive Plan ($'s in Millions)			
		CO2 Tax Cases	
Scenario		None	High Gas
500 MW Coal - 100 MW in '06, 100 MW in '08		**0.000**	415.936
500 MW Coal - No Wind		(67.534)	384.925
	Change due to CO2 Tax Only		452.459
400 MW Coal - No Wind		(45.047)	377.787
	Change due to CO2 Tax Only		422.834
500 MW Coal - 100 MW in '06		(28.244)	398.632
	Change due to CO2 Tax Only		426.876
400 MW Coal - 100 MW in '06, 100 MW in '08		12.520	405.083
	Change due to CO2 Tax Only		392.563

While the CO2 tax significantly increases the PVRR in all cases, the increase is lesser in scenarios where either wind resources are available or the size of the coal addition is decreased.

CO2 Limitations With Wind Sensitivities For Capacity Factor and PTC Availability

The following table shows the impact of the combination of the capacity factor sensitivity and the availability of the PTC with the imposition of a CO2 tax. The changes are compared against the Comprehensive Plan with a CO2 tax in effect.

Wind Sensitivity - Capacity Factor and PTC Availability				
With CO2 Tax & High Gas Prices				
PVRR Changes from Comp Plan with CO2 Tax ($'s in Millions)				
		Production Tax Credit Availability (In-Service Year)		
Scenario		Thru 2005	Thru 2006	Thru 2008
With CO2 Tax (High Gas Prices)				
500 MW Coal - 100 MW in '06, 100 MW in '08				
	Base Capacity Factor	**0.000**	(59.985)	(93.417)
	Low Capacity Factor	22.724	(32.093)	(60.657)
	High Capacity Factor	(22.716)	(87.869)	(126.168)
500 MW Coal - No Wind		(31.011)		
400 MW Coal - No Wind		(38.149)		
500 MW Coal - 100 MW in '06				
	Low Capacity Factor	(5.305)	(60.122)	
	Base Capacity Factor	(17.304)	(77.288)	
	High Capacity Factor	(29.297)	(94.449)	
400 MW Coal - 100 MW in '06, 100 MW in '08				
	Low Capacity Factor	11.921	(42.895)	(71.461)
	Base Capacity Factor	(10.853)	(70.838)	(104.270)
	High Capacity Factor	(33.616)	(98.770)	(137.069)

The above illustrates that with a high capacity factor and no PTC, the Comprehensive Plan comes close to having the same effect as eliminating wind from the Comprehensive Plan. The extension of the PTC with the Comprehensive Plan and a low capacity factor is shown to be more favorable than the Comprehensive Plan without the addition of wind.

Economic Evaluation Results of Scenario Analysis

The following table shows the PVRR results of the various scenarios when compared to the recommended Comprehensive Plan with the base case assumption.

Wind Sensitivity Summary

Capacity Factor and PTC Availability & CO2 Tax

PVRR Changes from Comprehensive Plan ($'s in Millions)

Scenario	Production Tax Credit Availability (In-Service Year) Thru 2005	Thru 2006	Thru 2008
No CO2 Tax			
500 MW Coal - 100 MW in '06, 100 MW in '08			
Base Capacity Factor	**0.000**	(59.984)	(93.418)
Low Capacity Factor	18.393	(36.423)	(64.988)
High Capacity Factor	(18.386)	(83.536)	(121.835)
500 MW Coal - No Wind	(67.534)		
400 MW Coal - No Wind	(45.047)		
500 MW Coal - 100 MW in '06			
Low Capacity Factor	(18.564)	(73.380)	
Base Capacity Factor	(28.244)	(88.228)	
High Capacity Factor	(37.921)	(103.074)	
400 MW Coal - 100 MW in '06, 100 MW in '08			
Low Capacity Factor	30.950	(23.869)	(52.432)
Base Capacity Factor	12.520	(47.467)	(80.899)
High Capacity Factor	(5.904)	(71.057)	(109.357)
With CO2 Tax (High Gas Prices)			
500 MW Coal - 100 MW in '06, 100 MW in '08			
Low Capacity Factor	438.660	383.843	355.279
Base Capacity Factor	415.936	355.951	322.519
High Capacity Factor	393.220	328.067	289.768
500 MW Coal - No Wind	384.925		
400 MW Coal - No Wind	377.787		
500 MW Coal - 100 MW in '06			
Low Capacity Factor	410.631	355.814	
Base Capacity Factor	398.632	338.648	
High Capacity Factor	386.639	321.487	
400 MW Coal - 100 MW in '06, 100 MW in '08			
Low Capacity Factor	427.857	373.041	344.475
Base Capacity Factor	405.083	345.098	311.666
High Capacity Factor	382.320	317.166	278.867

Key findings based on the results are discussed below:

- With no extension of the PTC, the Comprehensive Plan yields a PVRR $67 million higher than a similar plan without wind. If the PTC is extended through 2006, this difference in PVRR is less than $8 million. If the PTC is extended through 2008, the Comprehensive Plan is favored over all plans when no CO2 limits are in effect.
- Reducing the share of Iatan 2 produces a higher PVRR than maintaining the recommended 500 MW share. This is true for all cases without CO2 limitations. When CO2 limitations are assumed, the reduction in KCP&L's share of Iatan 2 is favored. If CO2 limitations are imposed, KCP&L believes the best and most economic remediation will be associated with KCP&L's older, less efficient units rather than decreasing the share of the newest, most efficient base load unit in the fleet.

5.0 Conclusions and Recommendations

KCP&L believes the addition of wind provides a number of benefits when designing a balanced set of resources for the Comprehensive Plan. No single resource option will perform well under all future scenarios. Wind in KCP&L's portfolio will provide significant future risk mitigation to the uncertainties of CO2 legislation and a mandated renewables standard. The primary drivers for adding wind resources include the following:

- The expectation through the proposed CAIR and Mercury Rule of reductions in allowable emissions of NOx, SO2 and mercury and the associated allowance price volatility
- The expectation of the passage of a Renewables Portfolio Standard at either the Federal or State level
- The expectation for some required reduction or limitation in the emissions of CO2
- Expectations for continued fuel price volatility especially in Natural Gas through the next 10 years
- Meeting the corporate objective of providing service to our customers in an environmentally responsible manor
- The need for KCP&L to expand operating expertise into renewable resources.

The economics for supporting wind at today's relative costs are driven by two key drivers; the Production Tax Credit and the quality of the wind resource, In the absence of a PTC, the addition of wind resources increases PVRR when compared to alternative resources. The quality of the wind resource, modeled as site capacity factor in the analysis, indicates that wind economics are greatly enhanced with greater capacity factors. While it is difficult to mitigate the risks of poor wind availability, the selection of quality high wind resource sites will help mitigate against the risk of poor wind availability. Currently, with the current stage of development of sites in Kansas, KCP&L believes that Kansas Sites offer the best potential for the 2006 wind project. Additional

consideration will be made to continue to assess sites in Missouri as alternatives for the proposed 2008 project.

KCP&L recommends the addition of at least 100 MW of wind, to be located on a developed Kansas Site in the 2006 timeframe. It is KCP&L's belief that the mandate for the addition of renewable resources will eventually require KCP&L to add renewable generation. The development of wind by 2006 will provide the Company with the opportunity to gain knowledge and operating experience with this renewable energy resource. That experience will better position KCP&L to react to potential future RPS legislation as well as providing risk mitigation for the numerous uncertainties listed above. Also, the addition of wind is part of KCP&L's proposed efforts to obtain reductions in our fleet-wide emissions of CO2 as measured on a Lbs/MWh intensity basis.

If the PTC is extended through 2008, KCP&L recommends approval of all wind resources contained in the Comprehensive Plan. If the extension does not occur or does not apply to 2008 installations, the recommendation would be to reevaluate the second proposed addition of wind resources in the 2006 timeframe.