BEFORE THE MINNESOTA OFFICE OF ADMINISTRATIVE HEARINGS
600 North Robert Street
St. Paul, MN 55101

FOR THE MINNESOTA PUBLIC UTILITIES COMMISSION
121 7th Place East, Suite 350
St Paul MN 55101-2147

IN THE MATTER OF THE APPLICATION FOR CERTIFICATES OF NEED FOR THREE 345 kV TRANSMISSION LINE PROJECTS WITH ASSOCIATED SYSTEM CONNECTIONS

Docket No. ET2,E002, et al./CN-06-1115

SURREBUTTAL TESTIMONY AND EXHIBITS OF SUSAN L. PEIRCE

ON BEHALF

OF THE MINNESOTA OFFICE OF ENERGY SECURITY

JULY 3, 2008

I. INTRODUCTION

Q. Please state your name.

A. My name is Susan L. Peirce

Q. Are you the same Susan Peirce that filed Direct Testimony in this proceeding?

A. Yes.

Q. What is the purpose of your Surrebuttal Testimony?

A. I respond to Mr. Michaud's Rebuttal Testimony, and have a brief response to Mr. Lacey's Rebuttal Testimony.

Q. What concern does Mr. Michaud raise with your Direct Testimony?

A. In his Rebuttal Testimony Mr. Michaud takes issue with my assumption that 100 percent of future generation that utilities obtain to comply with the Minnesota Renewable Energy Standard (RES) comes from wind energy. He argues that renewable technologies other than wind have higher nameplate and accredited capacity factors which would significantly reduce the MW capacity additions necessary to meet future RES obligations.

Q. How do you respond?

A. Mr. Michaud implies wind and biomass projects are simply interchangeable. However, as Mr. Michaud indicates, biomass projects typically provide baseload energy; wind energy, on the other hand, is an intermittent resource which provides energy when the

wind blows. Further, there are different considerations between wind and biomass due to cost factors, emission issues, and siting matters. The question about which resource is best to meet the RES is not a simple consideration. For example, the decision as to whether or not baseload energy is needed by a utility is a resource planning issue that will need to be addressed in the resource plans submitted by the respective utilities and approved by the Commission.

In addition, I expect wind to provide the majority of the capacity additions necessary to meet future RES obligations because of the significant wind resources available in Minnesota.

Q. Please explain the wind resource availability.

A. The wind maps available on the Minnesota Department of Commerce website demonstrate the availability of significant wind resources in the state.[1] Additionally, the American Wind Energy Association lists North Dakota, South Dakota, and Minnesota all in the top ten states for wind resources (OES Exhibit No. ___ (SLP-16)).

A review of the facility additions since the passage of Minnesota's Renewable Energy Objective in 2001 show that approximately 68 percent of the renewable generation coming online has been wind energy, with approximately 25 percent from biomass and the remaining 6 percent from hydro facilities (OES Exhibit No. ___ (SLP-17)).

[1] Wind maps available at the Minnesota Department of Commerce website: http://www.state.mn.us/portal/mn/jsp/content.do?id=-536881350&subchannel=-536881511&sc2=null&sc3=null&contentid=536887066&contenttype=EDITORIAL&programid=536902421&agency=Commerce

Xcel has added the most capacity from biomass facilities since 2001. The directive in Minn. Stat. §216B.1691, Subd. 2a(b) that 25 percent of Xcel's RES obligation come from wind energy limits Xcel's ability to add biomass facilities in the future.

Q. What is the per MWh cost of biomass?

A. A handout prepared by Xcel in its petition for Approval of a Biomass Power Purchase Agreement with FibroMinn, L.L.C. Docket No. E002/M-00-1169[2] shows an average price per MWh from a number of Xcel's biomass contracts in the range of $85 to $130 per MWh (OES Exhibit No. ___ (SLP-18)). While not directly comparable, Xcel has entered a number of small wind PPAs priced at $33/MWh[3] (OES Exhibit No. ___ (SLP-19)).

While wind is an intermittent resource which is not always available, the availability and cost of biomass fuel is also raised as a concern in biomass projects. Interestingly, Mr. Michaud, on behalf of The Institute for Local Self Reliance, argued the FibroMinn PPA was not in the public interest because the project, which relied on turkey litter for its fuel, could experience an inadequate supply of manure, and would displace the use of the manure as a soil enricher for organic farming.

Given the availability of wind resources and its relative cost, I believe my assumption to rely on wind additions in determining RES capacity additions is reasonable.

[2] In the Matter of Xcel Energy's Petition for Approval of a Biomass Power Purchase Agreement with FibroMinnesoa, L.L.C. for 50 MW of Biomass Power, Docket No. E002/M-00-1169

[3] In the matter of the Petition of Northern States Power Company d/b/a Xcel Energy for Approval of a Revised Standard Small Wind Contract and 37 Power Purchase Agreements and First Amendments for Wind Energy from Small Wind Projects; Docket No. E002/M-04-998

Q. In his Rebuttal Testimony, Mr. Lacey identifies two facilities that were not included in the list of renewable facilities identified in response to DOC IR No. 34, as well as one facility that was included that should not have been. Have you made any adjustments in your analysis for these two additional facilities?

A. Yes. Mr. Lacey identified Xcel's Grand Meadow wind facility, and CMMPA's Granite Falls 1.4 MW hydro facility as the two facilities omitted from the response to DOC IR. No. 34. In addition, Mr. Lacey indicated that the Ford Hydro facility has been sold to a utility other than Xcel, and should not be included in Xcel's portfolio of renewable generation.

The Grand Meadow facility was already included in the calculations contained in my Direct Testimony. I have revised my calculations (OES Exhibit No. ___ (SLP-20, 21, 22, 23 and 24)) to reflect the inclusion of the Granite Falls Hydro facility, and to remove generation from the Ford Hydro facility from my estimate of RES need. Table 1 below summarizes the capacity changes.

Table 1: Summary of RES Capacity Need

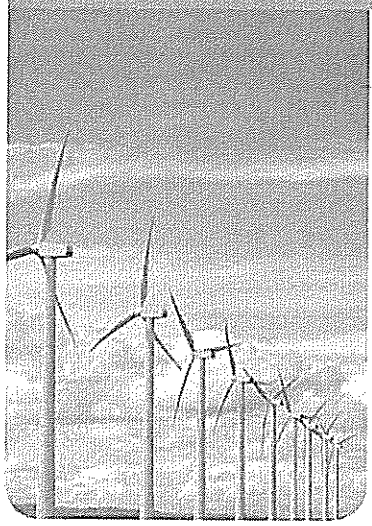
Assumptions	2020 Nameplate Capacity Need - Direct	2020 Nameplate Capacity Need - REVISED	2020 Accredited Capacity Need – Direct	2020 Accredited Capacity Need- REVISED
1% energy savings/ 30% wind capacity factor	4,911	4,927	663	665
1% energy savings/ 40% wind capacity factor	3,409	3,416	460	461
1.5% energy savings/ 30% wind capacity factor	4,563	4,580	616	618
1.5% energy savings/ 40% wind capacity factor	3,148	3,160	425	427

The two revisions have only a minimal impact on the estimated need.

Q. Does this complete your Surrebuttal Testimony?

A. Yes.

Top 20 States with Wind Energy Resources



The United States has tremendous wind energy resources. Although California gave birth to the modern U.S. wind industry, 16 states have greater wind potential.

Installed wind energy generating capacity now totals 16,818 MW. The installed wind power fleet is expected to generate an estimated 48 billion kilowatt-hours (kWh) of wind energy in 2008, just over 1% of U.S. electricity supply, powering the equivalent of over 4.5 million homes.

By contrast, the total amount of electricity that could potentially be generated from wind in the United States has been estimated at 10,777 billion kWh annually—more than twice the electricity generated in the U.S. today.

Germany is the world leader in terms of installed wind power, with over 20,000 MW installed, yet it has only a fraction of the wind energy potential that North Dakota alone has.

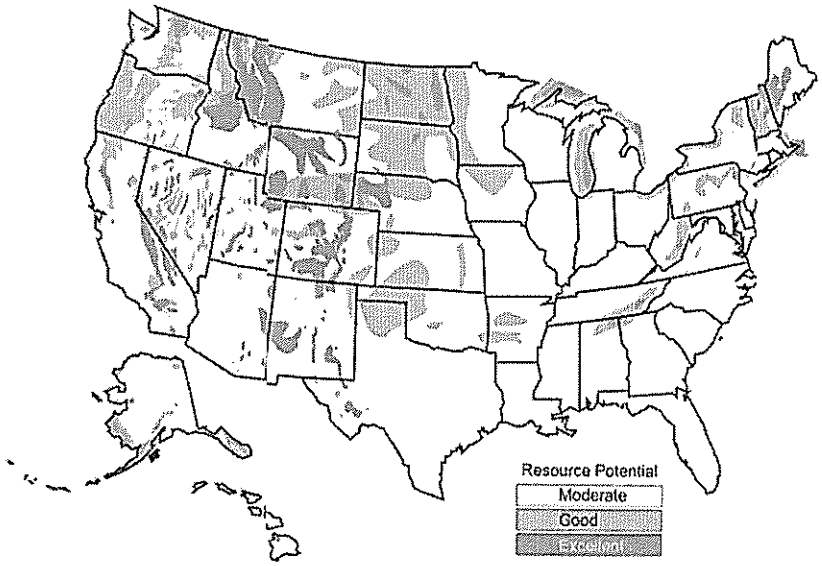
Large wind systems require average wind speeds of 6 meters/second (13 mph)

In graph below, "moderate" means wind speeds of 6.4-7 meters per second (m/s) at a 50-meter height, "good" means 7-7.5 m/s, and "excellent" means 7.5 m/s and higher.

THE TOP TWENTY STATES for wind energy potential, as measured by annual energy potential in the billions of kWhs, factoring in environmental and land use exclusions for wind class of 3 and higher.

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, 1991.*



Generation by Source: Facilities since 2001

	Hydro	Wind	Biomass	Total
CMMPA		29,945		29,945
Dairyland Power Cooperative		8,716	14,460	23,177
Great River Energy (GRE)		124,318	23,331	147,649
Interstate Power & Light (IPL)	1,570	17,415		18,985
MN Municipal Power Agency (MMPA)	24,960	1,419		26,379
Minnesota Power		12,667		12,667
Minnkota Power Cooperative				-
Missouri River Energy Services (MRES)		8,154		8,154
Otter Tail Power	1,059	9,591		10,651
Rochester Public Utilities				-
So. MN Municpal Power Agency SMMPA		50,054	8,447	58,502
Xcel	76,981	844,167	372,767	1,293,914
Total	104,570	1,106,448	419,005	1,630,023
2,590.5	6.4%	67.9%	25.7%	

Docket No. ET2,E002, et al./CN-06-1115
OES Exhibit No. ___ (SLP-17)

Prepared for Docket E002/M-00-1169

ATTACHMENT B

Docket No. ET2,E002, et al./CN-06-1115
OES Exhibit No. ___ (SLP-18)

SUMMARY OF BIOMASS CONTRACT COSTS

	NPV (000's) (1999$)	Avg. Price ($/MWH)	Total Pmts. (000's)
EPS/Beck 25 MW	$189,511	$129.83	$490,739
District Energy 25 MW	$115,768	$95.25	$292,049
EPS/Beck 50 MW	$308,634	$105.37	$796,560
Fibrowatt (Currently filed)	$258,693	$85.97	$707,527
Fibrowatt (Original Offer w/Certain pass-throughs eliminated)	$284,079	$94.21	$775,284

ATTACHMENT 3
(Summary of Small Wind PPAs)

Seller	Term/Price	COD (Outside Limit)	PTC Amendment Language	Curtailment Amendment	Approval	Clause
Group III						
26. Minwind III, LLC 27. Minwind IV, LLC 28. Minwind V, LLC 29. Minwind VI, LLC 30. Minwind VII, LLC 31. Minwind VIII, LLC 32. Minwind IX, LLC 33. Carstensen Wind, LLC 34. Lucky Wind, LLC 35. Greenback Energy, LLC 36. Northern Lights Wind, LLC 37. Stahl Wind Energy, LLC	20 Years $33/MWh delivered plus curtailment payments as limited.	12/31/08	Section 2.4(b) deleted. Eliminates alternate pricing and termination if PTCs unavailable. Price fixed regardless of PTC.	No payment for first $3000 of curtailment/year prior to 10/1/07. No curtailment threshold after 10/1/07. (MinWind group 26-32 only) Clarified PTC payments for curtailed energy only to extent PTCs otherwise available. This clause already existed in others.	Yes. If MPUC denies or conditions approval, parties negotiate amendments for 60 days. No termination Right if failure to get approval.	Remains.

ATTACHMENT 3
(Summary of Small Wind PPAs)

Seller	Term/Price	COD (Outside Limit)	PTC Amendment Language	Curtailment Amendment	MPUC Approval	Confidentiality Clause
Group I						
1. Gary J.T. LLC 2. Jenna M.T. LLC 3. Krysta J.T. LLC 4. Theresa M.T. LLC 5. Mark J.P. LLC 6. Wally's Wind Farm LLC 7. Salty Dog-I LLC 8. Windy Dog-I LLC 9. Roadrunner-I LLC 10. Breezy Bucks-I LLC 11. Breezy Bucks-II LLC 12. Salty Dog-II LLC 13. Shane's Wind Machine LLC 14. McBeth Wind-1 LLC 15. McBeth Wind-2 LLC 16. McBeth Wind- 3 LLC 17. Vander Woude Wind LLC	20 Years $33/MWh delivered plus curtailment payments as limited.	12/31/08	If PTC not extended to at least 12/31/07 prior to 7/1/05, Seller may terminate. If Seller does not terminate, no change in $33.00 price. Vander Woude (18 only) termination right if MN incentive not available or not obtained USDA grant by 1/1/07.	No payment for first $3000 of curtailment in a calendar year. Curtailments in excess of $3000 annually are paid. Curtailment threshold for life of PPA.	Yes. If MPUC has not approved on or before October 31, 2004, NSP can terminate on October 31, 2004.	Deleted.

ATTACHMENT 3
(Summary of Small Wind PPAs)

Seller	Term/Price	COD (Outside Limit)	PTC Amendment Language	Curtailment Amendment	MPUC Approval	Confidentiality Clause
Group II						
18. Hillcrest Wind, LLC 19. TAIR Windfarm, LLC 20. Bendwind, LLC 21. DeGreeff DP, LLC 22. DeGreeffpa, LLC 23. Groen Wind, LLC 24. Larswind, LLC 25. Sierra Wind, LLC	20 Years $33/MWh delivered plus curtailment payments as limited.	12/31/08	Section 2.4(b) deleted. Eliminates alternate pricing and termination if PTCs unavailable. Price fixed regardless of PTC.	No payment for first $3000 of curtailment/year prior to 10/1/07. No curtailment threshold after 10/1/07.	Yes. If MPUC denies or conditions approval, parties negotiate amendments for 60 days. NSP option to terminate (10 days) if negotiations unsuccessful.	Remains.

Estimate of 2010 Renewable Generation
REVISED

Company	Total System Retail Sales (MWh) 2006 Col. B OES #33	Total Minnesota Retail Sales (MWh) 2006 Col. C OES #33	MN as % of Total 2006 Col. D Col B/ Col. C	Total Renewable Generation (MWh) 2006 Col. E OES #34	Renewables assigned to other projects/not eligible (MWh) Col. F OES #34	Minnesota Eligible Renewable Generation (MWh) Col. G Col. E - Col. F	RES as % of Retail Sales Col. H Col. G/Col. C	Planned Additional Renewable Generation to 2010				Estimated 2010 Renewable Generation (MWh)	
								Adjustment for 2007 Additions Col. I OES #34	Wind - 30% Capacity Factor Col. J OES #34	Wind - 40% Capacity Factor Col. K OES #34	Other: Biomass/ Hydro Col. L OES #34	Wind - 30% Capacity Factor Col. M Cols. C+I+J+L	Wind - 40% Capacity Factor Col. N Cols. G+I+K+L
CMMPA	519,399	519,399	100.0%	30,045	100	29,945	5.8%	-	35,792	49,056	-	66,737	79,001
Dairyland Power Cooperative	4,388,479	756,325	17.2%	179,233	148,405	30,828	4.1%	-	18,081	24,108	9	48,918	54,945
Great River Energy (GRE)	10,860,872	10,860,872	100.0%	550,447	254,280	296,167	2.7%	-	522,972	697,296	-	819,139	993,463
Interstate Power & Light (IPL)	16,061,134	835,777	5.2%	769,950	738,053	31,897	3.8%	-	-	-		31,897	31,897
MN Municipal Power Agency (MMPA)	1,338,311	1,338,311	100.0%	27,360	981	26,379	2.0%	-	-	-	-	26,379	26,379
Minnesota Power	9,077,994	9,077,994	100.0%	759,446	135,424	624,022	6.9%	162,181	92,768	123,691	-	878,972	909,894
Minnkota Power Cooperative	3,401,879	1,728,174	50.8%	2,794	2,794	-	0.0%	-	366,606	488,808		366,606	488,808
Missouri River Energy Services (MRES)	1,890,976	996,079	52.7%	9,748	1,594	8,154	0.8%	-	53,598	71,464	-	61,752	79,618
Otter Tail Power	3,987,770	2,085,660	52.3%	107,135	52,571	54,565	2.6%	(20,389)	84,583	112,777	1,100	119,858	148,052
Rochester Public Utilities				13,513	-	13,513					17,520	31,033	31,033
So. MN Municpal Power Agency SMMPA	2,966,000	2,966,000	100.0%	65,734	7,634	58,101	2.0%	-	157,680	210,240	76,996	292,777	345,337
Xcel	43,622,668	32,882,516	75.4%	3,255,218	963,337	2,291,881	7.0%	368,046	1,552,019	2,069,359	32,747	4,244,694	4,762,034
Total	98,115,482	64,047,107	65.3%	5,770,624	2,305,173	3,465,452	5.4%	509,838	2,885,099	3,846,798	128,372	6,988,761	7,950,460

Docket No. ET2,E002, et al./CN-06-1115
OES Exhibit No. ____ (SLP-20)

REVISED
Estimated RES Capacity Need:
Net 1.5% Energy Forecast and 40% Wind Capacity Factor

Summary							
Year	Net 1.5% Energy Forecast (MWh)	REO Requirement (%)	REO Gross Energy Need (MWh)	REO Energy Online (MWh)	REO Net Energy Need (MWh)	REO Nameplate Capacity Need (MW)	REO Accredited Capacity Need (MW)
	From OES Exhibit CTD-2	Statutory Percentage	Column 1 * Column 2	INPUT	Column 3 - Column 4	Column 5 / (0.4 * 8,760)	Column 6 * 0.135
	1	2	3	4	5	6	7
2010	71,256,699		7,675,354	7,950,460	-275,106	-79	-11
2011	72,014,179		7,744,196	7,950,460	-206,264	-59	-8
2012	72,677,736		10,758,553	7,950,460	2,808,093	801	108
2013	73,220,379		10,831,499	7,950,460	2,881,039	822	111
2014	73,747,195		10,902,135	7,950,460	2,951,675	842	114
2015	74,321,450		10,978,914	7,950,460	3,028,454	864	117
2016	74,962,949		15,503,375	7,950,460	7,552,915	2156	291
2017	75,521,076		15,610,668	7,950,460	7,660,208	2186	295
2018	76,142,686		15,730,684	7,950,460	7,780,223	2220	300
2019	76,817,063		15,859,130	7,950,460	7,908,670	2257	305
2020	77,537,766		19,024,354	7,950,460	11,073,894	3160	427

REVISED
Estimated RES Capacity Need:
Net 1.0% Energy Forecast and 40% Wind Capacity Factor

Summary							
Year	Net 1.0% Energy Forecast (MWh)	REO Requirement (%)	REO Gross Energy Need (MWh)	REO Energy Online (MWh)	REO Net Energy Need (MWh)	REO Nameplate Capacity Need (MW)	REO Accredited Capacity Need (MW)
	From OES Exhibit CTD-2	Statutory Percentage	Column 1 * Column 2	INPUT	Column 3 - Column 4	Column 5 / (0.4 * 8,760)	Column 6 * 0.135
	1	2	3	4	5	6	7
2010	71,594,855		7,712,562	7,950,460	-237,898	-68	-9
2011	72,690,365		7,818,484	7,950,460	-131,977	-38	-5
2012	73,690,726		10,910,289	7,950,460	2,959,829	845	114
2013	74,567,512		11,033,181	7,950,460	3,082,720	880	119
2014	75,425,348		11,153,271	7,950,460	3,202,810	914	123
2015	76,327,981		11,279,072	7,950,460	3,328,611	950	128
2016	77,295,228		15,991,706	7,950,460	8,041,245	2295	310
2017	78,175,744		16,166,335	7,950,460	8,215,875	2345	317
2018	79,116,505		16,352,996	7,950,460	8,402,536	2398	324
2019	80,107,258		16,547,472	7,950,460	8,597,012	2453	331
2020	81,141,438		19,921,470	7,950,460	11,971,009	3416	461

REVISED
Estimated RES Capacity Need:
Net 1.0% Energy Forecast and 30% Wind Capacity Factor

Summary							
Year	Net 1.0% Energy Forecast (MWh)	REO Requirement (%)	REO Gross Energy Need (MWh)	REO Energy Online (MWh)	REO Net Energy Need (MWh)	REO Nameplate Capacity Need (MW)	REO Accredited Capacity Need (MW)
	From OES Exhibit CTD-2	Statutory Percentage	Column 1 * Column 2	INPUT	Column 3 - Column 4	Column 5 / (0.3 * 8,760)	Column 6 * 0.135
	1	2	3	4	5	6	7
2010	71,602,528		7,713,099	6,988,761	724,338	276	37
2011	72,705,686		7,819,556	6,988,761	830,796	316	43
2012	73,713,688		10,913,044	6,988,761	3,924,284	1493	202
2013	74,598,058		11,036,846	6,988,761	4,048,086	1540	208
2014	75,463,439		11,157,841	6,988,761	4,169,081	1586	214
2015	76,373,574		11,284,543	6,988,761	4,295,782	1635	221
2016	77,348,298		16,000,727	6,988,761	9,011,967	3429	463
2017	78,236,215		16,176,615	6,988,761	9,187,854	3496	472
2018	79,184,319		16,364,524	6,988,761	9,375,764	3568	482
2019	80,182,356		16,560,239	6,988,761	9,571,478	3642	492
2020	81,223,780		19,937,938	6,988,761	12,949,177	4927	665

REVISED
Estimated RES Capacity Neer:
Net 1.5 % Energy Forecast and 30 % Wind Capacity Factor

Summary							
Year	Net 1.5% Energy Forecast (MWh)	REO Requirement (%)	REO Gross Energy Need (MWh)	REO Energy Online (MWh)	REO Net Energy Need (MWh)	REO Nameplate Capacity Need (MW)	REO Accredited Capacity Need (MW)
	From OES Exhibit CTD-2	Statutory Percentage	Column 1 * Column 2	INPUT	Column 3 - Column 4	Column 5 / (0.3 * 8,760)	Column 6 * 0.135
	1	2	3	4	5	6	7
2010	71,256,699		7,675,354	6,988,761	686,594	261	35
2011	72,014,179		7,744,196	6,988,761	755,436	287	39
2012	72,677,736		10,758,553	6,988,761	3,769,792	1434	194
2013	73,220,379		10,831,499	6,988,761	3,842,739	1462	197
2014	73,747,195		10,902,135	6,988,761	3,913,374	1489	201
2015	74,321,450		10,978,914	6,988,761	3,990,153	1518	205
2016	74,962,949		15,503,375	6,988,761	8,514,615	3240	437
2017	75,521,076		15,610,668	6,988,761	8,621,908	3281	443
2018	76,142,686		15,730,684	6,988,761	8,741,923	3326	449
2019	76,817,063		15,859,130	6,988,761	8,870,369	3375	456
2020	77,537,766		19,024,354	6,988,761	12,035,593	4580	618