

Wind Economics - Explanation of Steps to 6.1% IRR-March 7, 6PM

NFAAT Submission Wind IRR Calculation (April/03) <ul style="list-style-type: none"> • 20 year life • Wind Power Production Incentive (WPPI) included • 250 MW, 2009 ISD • 5% Capital Cost Reduction 	7.5%	
16% Capital Cost Reduction <ul style="list-style-type: none"> • 250 MW, 2009 ISD 	9.2%	+1.7%
Various updates <ul style="list-style-type: none"> • Study Period Extended (to year 2037/38) • Wind Turbine Generator: 20 year life plus repowering • 3% Additional Generation Capital Cost Reduction for 450 MW • Revised O&M and Land Lease Costs • Updated, more realistic cash flow distribution 	9.5%	+0.3%
Revised Transmission Requirements to account for network upgrades required for 450MW (incremental to 250MW)	8.3%	-1.2%
Revised Wind Integration Costs <ul style="list-style-type: none"> • \$15.00Cdn/MWh • Shaping & Firming • Regulation • See CAC/MSOS/MH/NCN I - NFAAT - 30b 	6.9%	-1.4%
Removed WPPI	6.1%	-0.8%

WIND TABLE A.15 - Subset A

**450 MW WIND Power LONG-TERM Economics
LOW Export Prices
Capital Costs, Sequence Production Costs and Export Revenue
Millions of Constant 2002 Year Dollars (\$Cdn)**

column >

	A	B	C	D	E	F	G	
	Capital Costs 450 MW WIND Power ISD-2009						Revenue	
Fiscal Year	Generating Station (Service Life: 20 years)	Transmission Line (Service Life: 50 years)	Transmission Station (Service Life: 35 years)	Capital Tax	Fixed Production & Land Lease Costs	Wind Integration Costs	Export Revenue (Net of Variable Production Costs)	Fiscal Year
2002/03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2002/03
2003/04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2003/04
2004/05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2004/05
2005/06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2005/06
2006/07	0.00	7.56	2.13	0.05	0.00	0.00	0.00	2006/07
2007/08	181.98	30.24	8.53	1.15	0.00	0.00	0.00	2007/08
2008/09	363.95	36.29	10.24	3.20	0.00	0.00	0.00	2008/09
2009/10	60.66	1.51	0.43	3.52	20.40	20.73	75.60	2009/10
2010/11	0.00	0.00	0.00	3.52	20.40	20.73	75.66	2010/11
2011/12	0.00	0.00	0.00	3.52	20.40	20.73	76.09	2011/12
2012/13	0.00	0.00	0.00	3.52	20.40	20.73	76.84	2012/13
2013/14	0.00	0.00	0.00	3.52	20.40	20.73	76.65	2013/14
2014/15	0.00	0.00	0.00	3.52	20.40	20.73	76.84	2014/15
2015/16	0.00	0.00	0.00	3.52	20.40	20.73	78.34	2015/16
2016/17	0.00	0.00	0.00	3.52	20.40	20.73	78.54	2016/17
2017/18	0.00	0.00	0.00	3.52	20.40	20.73	77.92	2017/18
2018/19	0.00	0.00	0.00	3.52	20.40	20.73	78.12	2018/19
2019/20	0.00	0.00	0.00	3.52	20.40	20.73	78.82	2019/20
2020/21	0.00	0.00	0.00	3.52	20.40	20.73	78.89	2020/21
2021/22	0.00	0.00	0.00	3.52	20.40	20.73	79.02	2021/22
2022/23	0.00	0.00	0.00	3.52	20.40	20.73	79.86	2022/23
2023/24	0.00	0.00	0.00	3.52	20.40	20.73	79.98	2023/24
2024/25	0.00	0.00	0.00	3.52	20.40	20.73	80.11	2024/25
2025/26	0.00	0.00	0.00	3.52	20.40	20.73	80.34	2025/26
2026/27	0.00	0.00	0.00	3.52	20.40	20.73	81.09	2026/27
2027/28	118.36	0.00	0.00	3.52	20.40	20.73	81.24	2027/28
2028/29	266.31	0.00	0.00	3.52	20.40	20.73	81.48	2028/29
2029/30	29.59	0.00	0.00	2.56	20.40	20.73	81.59	2029/30
2030/31	0.00	0.00	0.00	2.56	20.40	20.73	81.72	2030/31
2031/32	0.00	0.00	0.00	2.56	20.40	20.73	82.60	2031/32
2032/33	0.00	0.00	0.00	2.56	20.40	20.73	82.62	2032/33
2033/34	0.00	0.00	0.00	2.56	20.40	20.73	82.84	2033/34
2034/35	0.00	0.00	0.00	2.56	20.40	20.73	82.94	2034/35
2035/36	0.00	0.00	0.00	2.56	20.40	20.73	83.56	2035/36
2036/37	0.00	0.00	0.00	2.56	20.40	20.73	83.82	2036/37
2037/38	0.00	0.00	0.00	2.56	20.40	20.73	81.58	2037/38

WIND TABLE A.15 - Subset B

**450 MW WIND Power LONG-TERM Economics
LOW Export Price**

column >	Millions of Constant 2002 Year Dollars (\$Cdn)			Millions of Present Value Cdn \$ discounted at 1.4%	Millions of Present Value Cdn \$ Cumulative
	Q	R	S	T	U
	COSTS	BENEFITS	NET COSTS	NET COSTS	NET COST CUMULATIVE
	Q = A + B + C	R = G minus sum of (D to F)	Q - R	T = column S Discounted	U = column T cumulative
Fiscal Yr					
2002/03					
2003/04	0.00	0.00	0.00	0.00	0.00
2004/05	0.00	0.00	0.00	0.00	0.00
2005/06	0.00	0.00	0.00	0.00	0.00
2006/07	9.69	-0.05	9.74	9.22	9.22
2007/08	220.75	-1.15	221.90	207.09	216.31
2008/09	410.48	-3.20	413.68	380.78	597.08
2009/10	62.60	30.96	31.64	28.72	625.81
2010/11	0.00	31.01	-31.01	-27.77	598.04
2011/12	0.00	31.45	-31.45	-27.77	570.27
2012/13	0.00	32.20	-32.20	-28.04	542.22
2013/14	0.00	32.01	-32.01	-27.50	514.72
2014/15	0.00	32.20	-32.20	-27.28	487.45
2015/16	0.00	33.69	-33.69	-28.15	459.29
2016/17	0.00	33.89	-33.89	-27.93	431.36
2017/18	0.00	33.28	-33.28	-27.05	404.31
2018/19	0.00	33.48	-33.48	-26.84	377.47
2019/20	0.00	34.18	-34.18	-27.03	350.44
2020/21	0.00	34.25	-34.25	-26.71	323.74
2021/22	0.00	34.37	-34.37	-26.44	297.30
2022/23	0.00	35.22	-35.22	-26.72	270.58
2023/24	0.00	35.34	-35.34	-26.44	244.14
2024/25	0.00	35.47	-35.47	-26.17	217.97
2025/26	0.00	35.69	-35.69	-25.98	191.99
2026/27	0.00	36.45	-36.45	-26.16	165.83
2027/28	118.36	36.59	81.76	57.89	223.72
2028/29	266.31	36.83	229.47	160.23	383.95
2029/30	29.59	37.91	-8.32	-5.73	378.22
2030/31	0.00	38.03	-38.03	-25.83	352.38
2031/32	0.00	38.92	-38.92	-26.07	326.31
2032/33	0.00	38.94	-38.94	-25.73	300.58
2033/34	0.00	39.16	-39.16	-25.52	275.07
2034/35	0.00	39.26	-39.26	-25.23	249.84
2035/36	0.00	39.88	-39.88	-25.28	224.56
2036/37	0.00	40.14	-40.14	-25.10	199.46
2037/38	0.00	37.90	-37.90	-23.37	176.09
	Residual Value as a Cost				
2038/39	-176.09				0.00

Costs = Capital Costs
Benefits = Total Export Revenue Net of Fixed & Variable Production Costs

WIND TABLE A.16 - Subset A

**450 MW WIND Power LONG-TERM Economics
HIGH Export Prices
Capital Costs, Sequence Production Costs and Export Revenue
Millions of Constant 2002 Year Dollars (\$Cdn)**

column >								
	A	B	C	D	E	F	G	
	Capital Costs 450 MW WIND Power ISD-2009						Revenue	
Fiscal Year	Capital Costs			Capital Tax	Fixed Production & Land Lease Costs	Wind Integration Costs	Export Revenue (Net of Variable Production Costs)	Fiscal Year
	Generating Station (Service Life: 20 years)	Transmission Line (Service Life: 50 years)	Transmission Station (Service Life: 35 years)					
2002/03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2002/03
2003/04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2003/04
2004/05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2004/05
2005/06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2005/06
2006/07	0.00	7.56	2.13	0.05	0.00	0.00	0.00	2006/07
2007/08	181.98	30.24	8.53	1.15	0.00	0.00	0.00	2007/08
2008/09	363.95	36.29	10.24	3.20	0.00	0.00	0.00	2008/09
2009/10	60.66	1.51	0.43	3.52	20.40	20.73	97.56	2009/10
2010/11	0.00	0.00	0.00	3.52	20.40	20.73	104.65	2010/11
2011/12	0.00	0.00	0.00	3.52	20.40	20.73	112.04	2011/12
2012/13	0.00	0.00	0.00	3.52	20.40	20.73	116.29	2012/13
2013/14	0.00	0.00	0.00	3.52	20.40	20.73	117.41	2013/14
2014/15	0.00	0.00	0.00	3.52	20.40	20.73	119.10	2014/15
2015/16	0.00	0.00	0.00	3.52	20.40	20.73	123.30	2015/16
2016/17	0.00	0.00	0.00	3.52	20.40	20.73	124.44	2016/17
2017/18	0.00	0.00	0.00	3.52	20.40	20.73	123.85	2017/18
2018/19	0.00	0.00	0.00	3.52	20.40	20.73	124.56	2018/19
2019/20	0.00	0.00	0.00	3.52	20.40	20.73	125.84	2019/20
2020/21	0.00	0.00	0.00	3.52	20.40	20.73	126.94	2020/21
2021/22	0.00	0.00	0.00	3.52	20.40	20.73	127.08	2021/22
2022/23	0.00	0.00	0.00	3.52	20.40	20.73	128.26	2022/23
2023/24	0.00	0.00	0.00	3.52	20.40	20.73	128.37	2023/24
2024/25	0.00	0.00	0.00	3.52	20.40	20.73	128.59	2024/25
2025/26	0.00	0.00	0.00	3.52	20.40	20.73	128.84	2025/26
2026/27	0.00	0.00	0.00	3.52	20.40	20.73	129.84	2026/27
2027/28	118.36	0.00	0.00	3.52	20.40	20.73	129.65	2027/28
2028/29	266.31	0.00	0.00	3.52	20.40	20.73	129.85	2028/29
2029/30	29.59	0.00	0.00	2.56	20.40	20.73	130.01	2029/30
2030/31	0.00	0.00	0.00	2.56	20.40	20.73	130.08	2030/31
2031/32	0.00	0.00	0.00	2.56	20.40	20.73	131.09	2031/32
2032/33	0.00	0.00	0.00	2.56	20.40	20.73	131.15	2032/33
2033/34	0.00	0.00	0.00	2.56	20.40	20.73	131.37	2033/34
2034/35	0.00	0.00	0.00	2.56	20.40	20.73	131.26	2034/35
2035/36	0.00	0.00	0.00	2.56	20.40	20.73	131.90	2035/36
2036/37	0.00	0.00	0.00	2.56	20.40	20.73	132.07	2036/37
2037/38	0.00	0.00	0.00	2.56	20.40	20.73	127.89	2037/38

WIND TABLE A.16 - Subset B

**450 MW WIND Power LONG-TERM Economics
HIGH Export Price**

Fiscal Yr	Millions of Constant 2002 Year Dollars (\$Cdn)			Millions of Present Value Cdn \$ discounted at 9.0%	Millions of Present Value Cdn \$ Cumulative
	Q	R	S	T	U
	COSTS	BENEFITS	NET COSTS	NET COSTS	NET COST CUMULATIVE
	Q = A + B + C	R = G minus sum of (D to F)	Q - R	T = column S Discounted	U = column T cumulative
2002/03					
2003/04	0.00	0.00	0.00	0.00	0.00
2004/05	0.00	0.00	0.00	0.00	0.00
2005/06	0.00	0.00	0.00	0.00	0.00
2006/07	9.69	-0.05	9.74	6.91	6.91
2007/08	220.75	-1.15	221.90	144.39	151.29
2008/09	410.48	-3.20	413.68	247.01	398.30
2009/10	62.60	52.92	9.68	5.31	403.61
2010/11	0.00	60.01	-60.01	-30.17	373.44
2011/12	0.00	67.40	-67.40	-31.10	342.34
2012/13	0.00	71.65	-71.65	-30.34	312.01
2013/14	0.00	72.77	-72.77	-28.27	283.74
2014/15	0.00	74.46	-74.46	-26.55	257.19
2015/16	0.00	78.66	-78.66	-25.73	231.46
2016/17	0.00	79.80	-79.80	-23.96	207.50
2017/18	0.00	79.20	-79.20	-21.82	185.68
2018/19	0.00	79.92	-79.92	-20.20	165.48
2019/20	0.00	81.20	-81.20	-18.84	146.64
2020/21	0.00	82.29	-82.29	-17.52	129.12
2021/22	0.00	82.43	-82.43	-16.10	113.02
2022/23	0.00	83.61	-83.61	-14.99	98.03
2023/24	0.00	83.73	-83.73	-13.77	84.26
2024/25	0.00	83.95	-83.95	-12.67	71.58
2025/26	0.00	84.19	-84.19	-11.66	59.92
2026/27	0.00	85.20	-85.20	-10.83	49.09
2027/28	118.36	85.00	33.35	3.89	52.98
2028/29	266.31	85.20	181.10	19.38	72.37
2029/30	29.59	86.33	-56.74	-5.57	66.79
2030/31	0.00	86.40	-86.40	-7.79	59.01
2031/32	0.00	87.41	-87.41	-7.23	51.78
2032/33	0.00	87.47	-87.47	-6.64	45.14
2033/34	0.00	87.69	-87.69	-6.11	39.03
2034/35	0.00	87.58	-87.58	-5.60	33.43
2035/36	0.00	88.22	-88.22	-5.17	28.26
2036/37	0.00	88.39	-88.39	-4.76	23.50
2037/38	0.00	84.21	-84.21	-4.16	19.34
2038/39	Residual Value as a Cost				
		-19.34			0.00

Costs = Capital Costs

Benefits = Total Export Revenue Net of Fixed & Variable Production Costs

Large Scale Wind Generation in Southern Manitoba

25% Capacity Factor

Levelized Cost: 10.6 cents/kWh
105.89 \$/MWh

Size 450 MW
Discount Rate 10% repowering @ 2029
Capacity Factor: 25%

Avg energy 987 GWh
In-Service-Date 2009
Life 40 years

Life	Wind Turbine Generator Capital Costs	WTG Repowering Capital Costs	Trans Line Capital Costs	Trans Station Capital Costs	Development Fund Costs	Average Energy (GWh)	0.5% Capital Taxes	Land Lease Costs	Fixed O&M Costs	trans maintenance	Wind Power Production Incentive	Total Costs
2002	0.00	0.00	0.00	0.00	n/a	0.00	0.00	0.00	0.00	0.00	n/a	0.00
2003	0.00	0.00	0.00	0.00	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	0.00	0.00	0.00	0.00	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2005	0.00	0.00	0.00	0.00	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	0.00	0.00	7.56	2.13	n/a	0.00	0.05	0.00	0.00	0.00	0.00	9.74
2007	181.98	0.00	30.24	8.53	n/a	0.00	1.15	0.00	0.00	0.00	0.00	221.90
2008	363.95	0.00	36.29	10.24	n/a	0.00	3.20	0.00	0.00	0.00	0.00	413.68
2009	60.66	0.00	1.51	0.43	n/a	987.00	3.52	2.03	18.27	0.11	0.00	86.51
2010	0.00	0.00	0.00	0.00	n/a	987.00	3.52	2.03	18.27	0.11	0.00	23.91
2011	0.00	0.00	0.00	0.00	n/a	987.00	3.52	2.03	18.27	0.11	0.00	23.91
2012	0.00	0.00	0.00	0.00	n/a	987.00	3.52	2.03	18.27	0.11	0.00	23.91
2013	0.00	0.00	0.00	0.00	0.00	987.00	3.52	2.03	18.27	0.11	0.00	23.91
2014	0.00	0.00	0.00	0.00	0.00	987.00	3.52	2.03	18.27	0.11	0.00	23.91
2015	0.00	0.00	0.00	0.00	0.00	987.00	3.52	2.03	18.27	0.11	0.00	23.91
2016	0.00	0.00	0.00	0.00	0.00	987.00	3.52	2.03	18.27	0.11	0.00	23.91
2017	0.00	0.00	0.00	0.00	0.00	987.00	3.52	2.03	18.27	0.11	0.00	23.91
2018	0.00	0.00	0.00	0.00	0.00	987.00	3.52	2.03	18.27	0.11	0.00	23.91
2019	0.00	0.00	0.00	0.00	0.00	987.00	3.52	2.03	18.27	0.11	0.00	23.91
2020	0.00	0.00	0.00	0.00	0.00	987.00	3.52	2.03	18.27	0.11	0.00	23.91
2021	0.00	0.00	0.00	0.00	0.00	987.00	3.52	2.03	18.27	0.11	0.00	23.91
2022	0.00	0.00	0.00	0.00	0.00	987.00	3.52	2.03	18.27	0.11	0.00	23.91
2023	0.00	0.00	0.00	0.00	0.00	987.00	3.52	2.03	18.27	0.11	0.00	23.91
2024	0.00	0.00	0.00	0.00	0.00	987.00	3.52	2.03	18.27	0.11	0.00	23.91
2025	0.00	0.00	0.00	0.00	0.00	987.00	3.52	2.03	18.27	0.11	0.00	23.91
2026	0.00	0.00	0.00	0.00	0.00	987.00	3.52	2.03	18.27	0.11	0.00	23.91
2027	0.00	118.36	0.00	0.00	0.00	987.00	3.52	2.03	18.27	0.11	0.00	23.91
2028	0.00	266.31	0.00	0.00	0.00	987.00	3.52	2.03	18.27	0.11	0.00	142.27
2029	0.00	29.59	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	290.22
2030	0.00	0.00	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	52.54
2031	0.00	0.00	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	22.95
2032	0.00	0.00	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	22.95
2033	0.00	0.00	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	22.95
2034	0.00	0.00	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	22.95
2035	0.00	0.00	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	22.95
2036	0.00	0.00	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	22.95
2037	0.00	0.00	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	22.95
2038	0.00	0.00	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	22.95
2039	0.00	0.00	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	22.95
2040	0.00	0.00	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	22.95
2041	0.00	0.00	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	22.95
2042	0.00	0.00	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	22.95
2043	0.00	0.00	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	22.95
2044	0.00	0.00	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	22.95
2045	0.00	0.00	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	22.95
2046	0.00	0.00	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	22.95
2047	0.00	0.00	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	22.95
2048	0.00	0.00	0.00	0.00	0.00	987.00	2.56	2.03	18.27	0.11	0.00	22.95
2056												
2057	317.78	32.30	41.09	11.59	0.00	4952.96	19.35	10.16	91.66	0.53	0.00	524.47

Large Scale Wind Generation in Southern Manitoba 35% Capacity Factor

Levelized Cost: 7.6 cents/kWh
75.62 \$/MWh

Size: 450 MW
Discount Rate: 10% repowering @ 2029
Capacity Factor: 35%
Avg energy: 1382 GWh
In-Service-Date: 2009
Life: 40 years

Life	Wind Turbine Generator Capital Costs	WTG Repowering Capital Costs	Trans Line Capital Costs	Trans Station Capital Costs	Development Fund Costs	Average Energy (GWh)	0.5% Capital Taxes	Land Lease Costs	Fixed O&M Costs	trans maintenance	Wind Power Production Incentive	Total Costs
2002	0.00	0.00	0.00	0.00	n/a	0.00	0.00	0.00	0.00	0.00	n/a	0.00
2003	0.00	0.00	0.00	0.00	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	0.00	0.00	0.00	0.00	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2005	0.00	0.00	0.00	0.00	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	0.00	0.00	7.56	2.13	n/a	0.00	0.05	0.00	0.00	0.00	0.00	9.74
2007	181.98	0.00	30.24	8.53	n/a	0.00	1.15	0.00	0.00	0.00	0.00	221.90
2008	363.95	0.00	36.29	10.24	n/a	0.00	3.20	0.00	0.00	0.00	0.00	413.68
2009	60.66	0.00	1.51	0.43	n/a	1382.00	3.52	2.03	18.27	0.11	0.00	86.51
2010	0.00	0.00	0.00	0.00	n/a	1382.00	3.52	2.03	18.27	0.11	0.00	23.91
2011	0.00	0.00	0.00	0.00	n/a	1382.00	3.52	2.03	18.27	0.11	0.00	23.91
2012	0.00	0.00	0.00	0.00	n/a	1382.00	3.52	2.03	18.27	0.11	0.00	23.91
2013	0.00	0.00	0.00	0.00	0.00	1382.00	3.52	2.03	18.27	0.11	0.00	23.91
2014	0.00	0.00	0.00	0.00	0.00	1382.00	3.52	2.03	18.27	0.11	0.00	23.91
2015	0.00	0.00	0.00	0.00	0.00	1382.00	3.52	2.03	18.27	0.11	0.00	23.91
2016	0.00	0.00	0.00	0.00	0.00	1382.00	3.52	2.03	18.27	0.11	0.00	23.91
2017	0.00	0.00	0.00	0.00	0.00	1382.00	3.52	2.03	18.27	0.11	0.00	23.91
2018	0.00	0.00	0.00	0.00	0.00	1382.00	3.52	2.03	18.27	0.11	0.00	23.91
2019	0.00	0.00	0.00	0.00	0.00	1382.00	3.52	2.03	18.27	0.11	0.00	23.91
2020	0.00	0.00	0.00	0.00	0.00	1382.00	3.52	2.03	18.27	0.11	0.00	23.91
2021	0.00	0.00	0.00	0.00	0.00	1382.00	3.52	2.03	18.27	0.11	0.00	23.91
2022	0.00	0.00	0.00	0.00	0.00	1382.00	3.52	2.03	18.27	0.11	0.00	23.91
2023	0.00	0.00	0.00	0.00	0.00	1382.00	3.52	2.03	18.27	0.11	0.00	23.91
2024	0.00	0.00	0.00	0.00	0.00	1382.00	3.52	2.03	18.27	0.11	0.00	23.91
2025	0.00	0.00	0.00	0.00	0.00	1382.00	3.52	2.03	18.27	0.11	0.00	23.91
2026	0.00	0.00	0.00	0.00	0.00	1382.00	3.52	2.03	18.27	0.11	0.00	23.91
2027	0.00	118.36	0.00	0.00	0.00	1382.00	3.52	2.03	18.27	0.11	0.00	142.27
2028	0.00	266.31	0.00	0.00	0.00	1382.00	3.52	2.03	18.27	0.11	0.00	290.22
2029	0.00	29.59	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	52.54
2030	0.00	0.00	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	22.95
2031	0.00	0.00	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	22.95
2032	0.00	0.00	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	22.95
2033	0.00	0.00	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	22.95
2034	0.00	0.00	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	22.95
2035	0.00	0.00	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	22.95
2036	0.00	0.00	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	22.95
2037	0.00	0.00	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	22.95
2038	0.00	0.00	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	22.95
2039	0.00	0.00	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	22.95
2040	0.00	0.00	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	22.95
2041	0.00	0.00	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	22.95
2042	0.00	0.00	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	22.95
2043	0.00	0.00	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	22.95
2044	0.00	0.00	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	22.95
2045	0.00	0.00	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	22.95
2046	0.00	0.00	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	22.95
2047	0.00	0.00	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	22.95
2048	0.00	0.00	0.00	0.00	0.00	1382.00	2.56	2.03	18.27	0.11	0.00	22.95
2056												
2057	317.78462	32.2961151	41.0907	11.5916858	0	6935.151	19.35241	10.16185	91.66209	0.5269109	0	524.4664

Large Scale Wind Generation in Southern Manitoba 40% Capacity Factor

Levelized Cost: 6.6 cents/kWh
66.19 \$/MWh

Size 450 MW
Discount Rate 10% repowering @ 2029 Avg energy 1579 GWh
Capacity Factor: 40%
In-Service-Date 2009
Life 40 years

Year	Wind Turbine Generator Capital Costs	WTG Repowering Capital Costs	Trans Line Capital Costs	Trans Station Capital Costs	Development Fund Costs	Average Energy (GWh)	0.5% Capital Taxes	Land Lease Costs	Fixed O&M Costs	trans maintenance	Wind Power Production Incentive	Total Costs
Life	20	20	50	35							n/a	
2002	0.00	0.00	0.00	0.00	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2003	0.00	0.00	0.00	0.00	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	0.00	0.00	0.00	0.00	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2005	0.00	0.00	0.00	0.00	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	0.00	0.00	7.56	2.13	n/a	0.00	0.05	0.00	0.00	0.00	0.00	0.00
2007	181.98	0.00	30.24	8.53	n/a	0.00	1.15	0.00	0.00	0.00	0.00	9.74
2008	363.95	0.00	36.29	10.24	n/a	0.00	3.20	0.00	0.00	0.00	0.00	221.90
2009	60.66	0.00	1.51	0.43	n/a	1579.00	3.52	2.03	18.27	0.11	0.00	413.68
2010	0.00	0.00	0.00	0.00	n/a	1579.00	3.52	2.03	18.27	0.11	0.00	86.51
2011	0.00	0.00	0.00	0.00	n/a	1579.00	3.52	2.03	18.27	0.11	0.00	23.91
2012	0.00	0.00	0.00	0.00	n/a	1579.00	3.52	2.03	18.27	0.11	0.00	23.91
2013	0.00	0.00	0.00	0.00	0.00	1579.00	3.52	2.03	18.27	0.11	0.00	23.91
2014	0.00	0.00	0.00	0.00	0.00	1579.00	3.52	2.03	18.27	0.11	0.00	23.91
2015	0.00	0.00	0.00	0.00	0.00	1579.00	3.52	2.03	18.27	0.11	0.00	23.91
2016	0.00	0.00	0.00	0.00	0.00	1579.00	3.52	2.03	18.27	0.11	0.00	23.91
2017	0.00	0.00	0.00	0.00	0.00	1579.00	3.52	2.03	18.27	0.11	0.00	23.91
2018	0.00	0.00	0.00	0.00	0.00	1579.00	3.52	2.03	18.27	0.11	0.00	23.91
2019	0.00	0.00	0.00	0.00	0.00	1579.00	3.52	2.03	18.27	0.11	0.00	23.91
2020	0.00	0.00	0.00	0.00	0.00	1579.00	3.52	2.03	18.27	0.11	0.00	23.91
2021	0.00	0.00	0.00	0.00	0.00	1579.00	3.52	2.03	18.27	0.11	0.00	23.91
2022	0.00	0.00	0.00	0.00	0.00	1579.00	3.52	2.03	18.27	0.11	0.00	23.91
2023	0.00	0.00	0.00	0.00	0.00	1579.00	3.52	2.03	18.27	0.11	0.00	23.91
2024	0.00	0.00	0.00	0.00	0.00	1579.00	3.52	2.03	18.27	0.11	0.00	23.91
2025	0.00	0.00	0.00	0.00	0.00	1579.00	3.52	2.03	18.27	0.11	0.00	23.91
2026	0.00	0.00	0.00	0.00	0.00	1579.00	3.52	2.03	18.27	0.11	0.00	23.91
2027	0.00	118.36	0.00	0.00	0.00	1579.00	3.52	2.03	18.27	0.11	0.00	23.91
2028	0.00	266.31	0.00	0.00	0.00	1579.00	3.52	2.03	18.27	0.11	0.00	142.27
2029	0.00	29.59	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	290.22
2030	0.00	0.00	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	52.54
2031	0.00	0.00	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	22.95
2032	0.00	0.00	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	22.95
2033	0.00	0.00	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	22.95
2034	0.00	0.00	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	22.95
2035	0.00	0.00	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	22.95
2036	0.00	0.00	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	22.95
2037	0.00	0.00	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	22.95
2038	0.00	0.00	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	22.95
2039	0.00	0.00	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	22.95
2040	0.00	0.00	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	22.95
2041	0.00	0.00	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	22.95
2042	0.00	0.00	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	22.95
2043	0.00	0.00	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	22.95
2044	0.00	0.00	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	22.95
2045	0.00	0.00	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	22.95
2046	0.00	0.00	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	22.95
2047	0.00	0.00	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	22.95
2048	0.00	0.00	0.00	0.00	0.00	1579.00	2.56	2.03	18.27	0.11	0.00	22.95
2056												
2057	317.78	32.30	41.09	11.59	0.00	7923.74	19.35	10.16	91.66	0.53	0.00	524.47