MIPUG EXHIBIT #20-2

VOLUME 2

Index – MIPUG Book of Documents

Manitoba Hydro's Needs For and Alternatives To (NFAT) Review

March 5-6, 2014

Tab #	Description	Sources
1	a) Manitoba Hydro's Forecast and Historical Energy and Capacity Savings b) Manitoba Hydro's Economic Effectiveness Metrics to assess energy efficient opportunities	a) 2013-2016 Power Smart Plan, pages 92-93, 98-99, Appendix E from the NFAT Application. b) 2013-2016 Power Smart Plan, pages 114-122, Available online: http://www.hydro.mb.ca/projects/development_plan/bc_documents/appendix_e_2013_16_power_smart_plan.pdf
2	a) MH-86 - DSM Options: Additional Evaluations for March 10	a) MH-86, NFAT Evidence Overview, Ed Wojczynski Presentation, March 3, 2014, page 15. Available online: http://www.pub.gov.mb.ca/nfat_hearing/NFAT%20Exhibits/MH-86.pdf
3	a) 2013 Load Forecast - 20 year Forecast Uncertainty b) 2004/05 Load Forecast – 20 Year Forecast Uncertainty c) Table 1: Manitoba Hydro Load Forecast – Uncertainty Range Calculation 2004/05 Load Forecast vs. 2013/14 Load Forecast – Calculated by MIPUG	a) 2013 Electric Load Forecast, pages 44-46, Appendix D from the NFAT Application. Available online: http://www.hydro.mb.ca/projects/development_plan/bc_documents/appendix_d_2013_electric_load_forecast.pdf b) 2004/05 Electric Load Forecast, page 52, CAC-MSOS-MH I-9 from the Application for General Rate Increase as approved conditionally in Board order 101-04. c) Sourced from 2013 Load Forecast, page 45 and 2004/05 Load Forecast, page 52.
4	a) Manitoba Hydro Rebuttal Evidence on Industrial Rate Options	a) Manitoba Hydro Rebuttal Evidence, February 28 2014, page 46 & 47. Available online: http://www.hydro.mb.ca/projects/development_plan/bc_documents/rebuttal/nfat_rebuttal_evidence_redacted.pdf
5	a) MH-87 – Load Forecast & Demand Side Management Presentation by Lloyd Kuczek b) PUB/MH I-216b	a) Manitoba Hydro Exhibit #87, March 4, 2014, pages 10, 11, 32-34, 36-37, 55 & 71. Available Online: http://www.pub.gov.mb.ca/nfat_hearing/NFAT%20Exhibits/MH-87.pdf b) PUB/MH I-216b. Available online: http://www.hydro.mb.ca/projects/development_plan/bc_documents/new/pub_round_1_responses.pdf

Tab #	Description	Sources
6	a) ACEEE Policy Brief – State Energy Efficiency Resource Standards – February 2014	a) American Council for Energy Efficient Economy (ACEEE) Policy Brief, State Energy Efficiency Resource Standards (EERS) – EERS Policy Approaches by State (as of February 2014). Available online: http://www.aceee.org/files/pdf/policy-brief/eers-07-2014.pdf

TAB 1

2013 - 2016 Power Smart Plan
Annual Capacity Savings (MW)

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28		MW at Generation 2027/28
RESIDENTIAL																	
Incentive Based																	
Home Insulation Program	1.7	3.3	4.7	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6		6.4
Water and Energy Saver Program	0.6	1.1	1.4	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2		1.3
Lower Income Energy Efficiency Program	1.0	1.9	2.7	3.5	3.5	3.5	3.5	3.3	3.1	3.0	2.6	2.4	2.2	2.1	2.1		2.4
Refrigerator Retirement Program	1.7	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	0.9	0.2	0.2	0.1		0.1
Subtotal	4.9	8.7	11.1	12.7	12.7	12.7	12.7	12.5	12.3	12.2	11.8	10.0	9.2	9.1	9.0	3%	10.2
Customer Service Initiatives / Financial Loan Programs																	
Power Smart Residential Loan	0.2	0.4	0.5	0.7	0.9	1.1	1.3	1.4	1.6	1.8	2.0	2.2	2.3	2.5	2.7		3.1
Power Smart PAYS Financing	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6		1.8
Residential Earth Power Loan	0.3	0.7	1.0	1.4	1.8	2.3	2.7	3.2	3.7	4.2	4.7	5.3	5.3	5.3	5.3		6.0
Subtotal	0.7	1.4	2.0	2.7	3.4	4.1	4.8	5.5	6.3	7.1	7.9	8.8	9.0	9.3	9.6	3%	10.9
COMMERCIAL																	
Incentive Based																	
Commercial Lighting Program	6.3	11.9	16.9	21.0	25.2	29.3	33.1	36.7	40.1	43.2	44.6	46.0	47.1	48.1	49.1		55.9
Commercial Building Envelope - Windows Program	0.7	1.3	1.7	1.9	2.2	2.5	2.8	3.1	3.3	3.5	3.8	4.0	4.2	4.5	4.7		5.3
Commercial Buliding Envelope - Insulation Program	0.8	1.4	1.9	2.2	2.5	2.8	3.0	3.2	3.4	3.6	3.7	3.9	4.0	4.1	4.2		4.8
Commercial Earth Power Program	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.1	3.5	4.0	4.4	4.8	5.2	5.7	6.1		6.9
Commercial HVAC Program - Chiller	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Commercial HVAC Program - CO2 Sensors	0.1	0.2	0.3	0.4	0.5	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.7	0.7		0.8
Commercial Custom Measures Program	0.2	0.5	0.7	1.0	1.2	1.5	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.6	3.8		4.4
Commercial Building Optimization Program	0.2	0.3	0.5	0.7	1.0	1.2	1.4	1.6	1.8	2.1	2.3	2.5	2.6	2.7	2.9		3.3
New Buildings Program	2.5	5.7	9.2	13.8	17.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7		24.8
Commercial Refrigeration Program	0.1	0.3	0.5	0.7	0.9	1.1	1.3	1.5	1.8	2.1	2.4	2.7	2.7	2.7	2.7		3.1
Commercial Kitchen Appliance Program	0.4	1.0	1.7	2.0	2.1	2.1	2.1	2.1	2.1	2.1	1.5	0.9	0.3	0.2	0.1		0.2
Network Energy Management Program	0.2	0.3	0.5	0.5	0.6	0.8	0.6	0.4	0.4	0.2	0.0	0.0	0.0	0.0	0.0		0.0
Internal Retrofit Program	0.3	0.4	0.5	0.5	0.6	0.8	0.9	1.1	1.2	1.3	1.4	1.4	1.3	1.3	1.2		1.4
Subtotal	12.1	24.1	35.5	46.2	56.6	66.8	72.2	77.4	82.4	87.3	89.3	91.8	93.3	95.3	97.2	32%	110.9
Customer Service Initiatives / Financial Loan Programs																	
Power Smart for Business PAYS Financing	0.0	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.6		0.7
Subtotal	0.0	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0%	0.7
INDUSTRIAL																	
Performance Optimization Program	2.0	4.0	6.0	8.1	10.1	12.1	14.2	16.2	18.2	20.2	22.3	24.3	26.3	28.3	30.4		33.4
Subtotal	2.0	4.0	6.0	8.1	10.1	12.1	14.2	16.2	18.2	20.2	22.3	24.3	26.3	28.3	30.4	10%	33.4
CONSERVATION SUBTOTAL	19.8	38.3	54.9	69.9	83.0	96.0	104.2	112.0	119.7	127.2	131.8	135.4	138.4	142.6	146.7	49%	166.1
LOAD MANAGEMENT																	
Curtailable Rates Program	146.4	146.4	146.4	147.3	147.3	147.3	147.3	147.3	147.3	147.3	147.3	147.3	147.3	147.3	147.3		162.0
LOAD MANAGEMENT SUBTOTAL	146.4	146.4	146.4	147.3	147.3	147.3	147.3	147.3	147.3	147.3	147.3	147.3	147.3	147.3	147.3	49%	162.0
LOAD DISPLACEMENT & ALTERNATIVE ENERGY																	
Bioenergy Optimization Program	1.2	2.6	4.0	5.1	5.9	6.7	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3		8.0
LOAD DISPLACEMENT & ALTERNATIVE ENERGY SUBTOTAL	1.2	2.6	4.0	5.1	5.9	6.7	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	2%	8.0
Program Impacts (at meter)	168	187	205	222	236	250	259	267	274	282	286	290	293	297	301	100%	
Program Impacts (at generation)	185	207	228	247	263	278	288	297	306	314	319	323	327	331	336		
Codes, Standards & Regulations (at meter)	14	28	46	71	82	90	99	107	115	120	120	122	127	132	135		
Codes, Standards & Regulations (at generation)	16	31	52	80	93	103	113	122	132	137	137	140	144	151	154		
POWER SMART 2013 to 2027 Impacts (at meter)	181	215	251	293	318	340	358	374	390	402	407	412	420	429	436		
POWER SMART 2013 to 2027 Impacts (at generation)	201	239	280	327	356	381	401	419	437	451	456	463	471	482	490		
POWER SMART SAVINGS TO DATE																	
Incentive Based Program Impacts (at meter)	205	205	205	204	203	202	201	200	200	196	194	190	180	175	168		
Incentive Based Program Impacts (at generation)	230	230	231	229	228	228	226	225	224	221	218	214	202	196	189		
Customer Service Initiatives Program Impacts (at meter)	8	8	8	8	8	8	8	8	8	8	8	8	8	7	6		
Customer Service Initiatives Program Impacts (at generation)	9	9	9	9	9	9	9	9	9	9	9	9	9	8	7		
Discontinued Programs (at meter)	41	41	29	29	28	28	28	28	28	27	26	26	25	25	25		
Discontinued Programs (at generation)	46	46	32	32	32	32	32	32	32	31	30	29	29	29	28		
Impacts of Codes & Standards (at meter)	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116		
Impacts of Codes & Standards (at generation)	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132		
TOTAL MW (at meter)	551	584	609	649	673	695	711	726	741	749	750	752	748	752	751		
TOTAL MW (at generation)	619	656	685	730	757	782	800	817	835	843	845	847	843	847	846		

Note: May not add up due to rounding.

2013 - 2016 Power Smart Plan
Annual Energy Savings (GW.h)

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28		GW.h at Generation 2027/28
RESIDENTIAL																	
Incentive Based																	
Home Insulation Program	3.2	6.0	8.6	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5		11.9
Water and Energy Saver Program	2.9	5.8	6.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8		6.6
Lower Income Energy Efficiency Program	2.4	4.7	6.9	8.7	8.7	8.7	8.7	8.3	7.9	7.4	6.5	6.0	5.7	5.3	5.3		6.1
Refrigerator Retirement Program	15.2	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	7.7	1.7	1.7	0.5		0.6
Subtotal	23.7	38.2	44.0	46.7	46.7	46.7	46.7	46.3	45.8	45.4	44.5	30.0	23.7	23.3	22.1	3%	25.2
Customer Service Initiatives / Financial Loan Programs																	
Power Smart Residential Loan	0.3	0.7	1.0	1.4	1.7	2.1	2.4	2.7	3.1	3.4	3.8	4.1	4.5	4.8	5.1		5.9
Power Smart PAYS Financing	0.3	0.6	0.8	1.1	1.3	1.5	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4		3.9
Residential Earth Power Loan	1.5	2.9	4.4	6.0	7.7	9.5	11.4	13.3	15.4	17.5	19.8	22.1	22.1	22.1	22.1		25.2
Subtotal	2.1	4.2	6.3	8.5	10.8	13.1	15.5	18.0	20.7	23.4	26.2	29.1	29.6	30.2	30.7	4%	35.0
COMMERCIAL																	
Incentive Based																	
Commercial Lighting Program	22.7	43.2	61.3	75.4	90.7	105.4	119.2	132.0	144.1	155.5	160.2	165.6	169.3	172.9	176.4		201.1
Commercial Building Envelope - Windows Program	1.7	3.2	4.3	4.9	5.6	6.4	7.1	7.7	8.4	9.0	9.6	10.1	10.7	11.3	11.8		13.5
Commercial Buliding Envelope - Insulation Program	1.9	3.5	4.8	5.6	6.4	7.1	7.8	8.3	8.8	9.2	9.5	9.9	10.2	10.5	10.8		12.3
Commercial Earth Power Program	1.6	3.3	4.9	6.6	8.2	9.9	11.5	13.2	14.8	16.6	18.3	20.1	21.9	23.6	25.4		29.0
Commercial HVAC Program - Chiller	1.1	2.3	3.5	5.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5		7.4
Commercial HVAC Program - CO2 Sensors	0.1	0.2	0.4	0.5	0.7	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0		1.1
Commercial Custom Measures Program	0.9	1.8	2.8	3.7	4.7	5.6	6.6	7.5	8.5	9.5	10.5	11.5	12.4	13.4	14.4		16.4
Commercial Building Optimization Program	0.9	1.6	2.5	3.6	4.7	5.8	6.8	8.0	9.2	10.5	11.4	12.3	13.1	13.6	14.2		16.1
New Buildings Program	10.3	22.6	35.9	51.9	66.5	81.7	81.7	81.7	81.7	81.7	81.7	81.7	81.7	81.7	81.7		93.2
Commercial Refrigeration Program	1.3	2.6	4.1	5.8	7.6	9.4	11.4	13.5	15.8	18.4	21.1	24.2	24.2	24.2	24.2		27.5
Commercial Kitchen Appliance Program	0.4	0.9	1.6	2.0	2.2	2.2	2.2	2.2	2.2	2.2	1.8	1.3	0.8	0.6	0.4		0.5
Network Energy Management Program	0.6	0.9	1.4	1.3	1.7	2.0	1.7	1.0	1.0	0.6	0.0	0.0	0.0	0.0	0.0		0.0
Internal Retrofit Program	2.4	3.0	3.3	2.9	3.7	4.7	5.6	6.5	7.4	8.3	8.4	8.4	8.3	8.2	8.1		9.2
Subtotal	45.9	89.2	130.6	169.2	209.3	247.7	268.9	289.2	309.4	328.9	340.1	352.7	360.1	367.5	374.8	55%	427.3
Customer Service Initiatives / Financial Loan Programs																	
Power Smart for Business PAYS Financing	0.2	0.4	0.6	0.8	0.9	1.1	1.2	1.3	1.4	1.6	1.7	1.8	1.9	2.1	2.2		2.5
Subtotal	0.2	0.4	0.6	0.8	0.9	1.1	1.2	1.3	1.4	1.6	1.7	1.8	1.9	2.1	2.2	0%	2.5
INDUSTRIAL																	
Performance Optimization Program	12.9	25.8	38.7	51.6	64.5	77.4	90.3	103.2	116.1	129.0	141.9	154.8	167.7	180.6	193.5		212.9
Subtotal	12.9	25.8	38.7	51.6	64.5	77.4	90.3	103.2	116.1	129.0	141.9	154.8	167.7	180.6	193.5	28%	212.9
CONSERVATION SUBTOTAL	84.8	157.8	220.2	276.8	332.2	385.9	422.6	458.1	493.4	528.2	554.3	568.4	583.0	603.6	623.4	91%	702.9
LOAD MANAGEMENT																	
Curtailable Rates Program	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
LOAD MANAGEMENT SUBTOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%	0.0
LOAD DISPLACEMENT & ALTERNATIVE ENERGY																	
Bioenergy Optimization Program	10.9	22.6	34.9	44.6	51.8	58.7	63.4	63.4	63.4	63.4	63.4	63.4	63.4	63.4	63.4		69.7
LOAD DISPLACEMENT & ALTERNATIVE ENERGY SUBTOTAL	10.9	22.6	34.9	44.6	51.8	58.7	63.4	63.4	63.4	63.4	63.4	63.4	63.4	63.4	63.4	9%	69.7
Program Impacts (at meter)	96	180	255	321	384	445	486	521	557	592	618	632	646	667	687	100%	
Program Impacts (at generation)	108	204	288	362	433	501	548	588	628	667	696	712	728	751	773		
Codes, Standards & Regulations (at meter)	58	116	194	291	350	400	448	495	541	566	580	601	629	661	683		
Codes, Standards & Regulations (at generation)	66	132	222	332	399	456	511	565	617	645	661	685	718	754	779		
POWER SMART 2013 to 2027 Impacts (at meter)	154	296	450	612	734	845	934	1,017	1,098	1,158	1,197	1,232	1,276	1,328	1,370		
POWER SMART 2013 to 2027 Impacts (at generation)	174	335	510	694	833	958	1,059	1,153	1,245	1,312	1,357	1,396	1,445	1,505	1,552		
POWER SMART SAVINGS TO DATE																	
Incentive Based Program Impacts (at meter)	918.3	917.9	919.0	916.6	914.1	911.4	907.6	904.9	900.9	867.9	847.7	823.4	760.2	719.6	683.4		
Incentive Based Program Impacts (at generation)	1,031.5	1,031.0	1,032.3	1,029.6	1,026.7	1,023.7	1,019.4	1,016.3	1,011.7	975.4	953.1	926.3	854.9	809.6	768.8		
Customer Service Initiatives Program Impacts (at meter)	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	21.9	21.3	17.5	17.5	16.1	12.1		
Customer Service Initiatives Program Impacts (at generation)	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.0	24.3	19.9	19.9	18.4	13.8		
Discontinued Programs (at meter)	291.7	255.3	233.4	231.5	228.8	226.9	226.5	226.5	226.5	215.2	206.6	198.1	187.4	184.8	180.3		
Discontinued Programs (at generation)	330.4	288.8	263.9	261.7	258.7	256.5	256.0	256.0	256.0	243.1	233.4	223.7	211.4	208.5	203.4		
Impacts of Codes & Standards (at meter)	505.4	505.4	505.4	505.4	505.4	505.4	505.4	505.4	505.4	505.4	505.4	505.4	505.4	505.4	505.4		
Impacts of Codes & Standards (at generation)	575.5	575.5	575.5	575.5	575.5	575.5	575.5	575.5	575.5	575.5	575.5	575.5	575.5	575.5	575.5		
TOTAL GW.h (at meter)	1,892	1,997	2,130	2,288	2,405	2,511	2,596	2,676	2,753	2,768	2,778	2,777	2,746	2,754	2,751		
TOTAL GW.h (at generation)	2,137	2,256	2,407	2,586	2,719	2,839	2,935	3,026	3,113	3,131	3,143	3,142	3,107	3,117	3,113		

683.4 + 12.1
+180.3 =
875.8 GW.h

Note: May not add up due to rounding.

2013 - 2016 Power Smart Plan
Annual Capacity Savings (MW)
(Savings to Date)
(1989/90 - 2012/13)

	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	Interim Estimate 2012/13	Benchmark 2027/28	At Generation 2027/28
RESIDENTIAL																										
Incentive Based																										
Home Insulation Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	2.03	5.16	7.96	10.69	13.77	16.38	18.92	19.90	19.90	22.69
Lower Income Energy Efficiency Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.36	0.70	1.54	2.92	3.36	1.35	1.53
New Home Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.19	0.44	0.73	0.97	1.18	1.46	1.56	1.56	1.56	1.77
Refrigerator Retirement Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.66	1.64	0.00	0.00
Water and Energy Saver Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.70	1.24	1.60	0.00	0.41
Subtotal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.86	2.22	5.60	8.81	12.01	15.65	20.08	25.30	28.07	22.81	26.40
Customer Service Initiatives																										
Power Smart Residential Loan Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.80	1.10	1.39	1.64	2.00	2.73	3.04	3.93	4.22	4.38	4.48	4.48	5.11
Residential Earth Power Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.25	0.63	1.06	1.42	2.07	2.47	2.99	3.28	3.43	3.62	1.58	2.99
ecoEnergy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Solar H2O Heater	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Power Smart PAYS Financing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.13	0.15
Subtotal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.89	1.35	2.02	2.70	3.42	4.80	5.51	6.92	7.50	7.81	8.23	6.19	8.10
DISCONTINUED/COMPLETED																										
Appliances	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	1.01	1.59	1.71	1.71	1.71	1.71	0.04	0.04
Seasonal LED Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.12	0.17	0.20	0.21	0.21	0.21	0.21	0.04	0.10
Outdoor Timer	0.29	0.52	0.90	1.23	1.51	1.86	1.99	2.28	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.72
Res Hot Water	0.00	0.00	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.09
Water Heater Rental	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05
Thermostat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.04	0.04	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Retrofit/Demonstration	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RBB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Efficiency Furnace & Boiler	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.43	0.43	0.43	0.43	0.49
Energy Efficient Light Fixtures	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.21	0.33	0.43	0.59	0.69	0.69	0.06	0.34
Compact Fluorescent Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.64	3.11	4.15	5.69	10.18	17.72	21.33	20.06	18.06	0.00	0.00	0.00
Power Smart Energy Manager	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.09	0.10	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.09	0.00	0.00
R2000 House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06
Subtotal	0.29	0.52	0.96	1.30	1.57	1.92	2.06	2.36	2.51	2.55	2.56	2.56	2.64	2.70	2.67	4.35	5.87	7.52	9.79	15.00	23.21	26.98	25.80	23.74	3.12	3.88
RESIDENTIAL TOTAL	0.29	0.52	0.96	1.30	1.57	1.92	2.06	2.36	2.51	2.55	2.56	2.56	3.11	3.58	4.02	7.22	10.79	16.54	23.40	32.52	45.78	54.55	58.92	60.04	32.12	38.39
COMMERCIAL																										
Incentive Based																										
Commercial Lighting Program	0.00	0.00	0.00	0.50	2.59	5.72	9.17	10.78	11.57	15.14	16.37	17.35	18.54	19.65	21.68	24.22	27.65	31.14	34.05	38.51	42.30	45.75	51.03	54.50	46.34	56.56
Commercial Earth Power Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.80	1.11	1.48	1.66	1.97	2.42	3.77	4.21	5.36	7.42	8.67	9.28	10.31	11.25	11.84	12.05	9.11	12.33
Commercial Insulation Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.75	1.84	3.17	4.85	6.22	6.73	6.73	7.68
Commercial Windows Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.17	0.26	0.31	0.39	0.45	0.62	0.82	1.05	1.49	1.66	1.76	2.09	2.97	3.99	5.07	5.56	5.32	6.07
Internal Retrofit Program	0.00	0.00	0.00	0.04	0.33	0.56	0.65	0.74	0.87	1.03	1.10	1.22	1.26	1.36	1.69	2.16	2.41	2.83	3.00	3.24	3.54	4.04	8.17*	8.22	8.22	9.38
Commercial Custom Measures Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.11	0.44	0.52	0.52	0.52	0.87	0.87	0.91	0.98	1.15	1.22	1.22	1.39	1.65	1.78	1.78	2.03
Commercial Refrigeration Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.84	1.34	1.63	1.92	2.14	2.21	0.84	0.95
Commercial HVAC Program - Chiller	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.04	0.04
City of Winnipeg Power Smart Agreement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.13	0.27	1.61	2.00	2.14	2.20	2.38	2.48	2.60	2.66	0.22	0.29
Commercial Clothes Washers Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.24	0.28	0.36	0.39	0.00	0.00
Commercial Kitchen Appliance Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.05	0.11	0.14	0.16	0.18	0.00	0.00
Power Smart Shops	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.14	0.14	0.14	0.00	0.00
Commercial Building Optimization Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.14	0.00	0.00
Network Energy Management Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00
New Buildings Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	1.34	1.34	1.53
CO2 Sensors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
Power Smart Energy Manager Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal	0.00	0.00	0.00	0.54	2.92	6.28	9.82	11.78	13.45	17.64	19.70	21.14	22.74	24.60	28.97	32.79	39.43	46.33	52.36	59.79	67.94	76.25	81.63	96.19	79.95	96.85
Customer Service Initiatives																										
Power Smart for Business PAYS Financing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DISCONTINUED/COMPLETED																										
Commercial Showerhead	0.00	0.00	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.23
Infrared Heat Lamp	0.00	0.00	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.69
Livestock Waterer	0.00	0.00	0.00	0.00	0.00	0.05	0.08	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.00	0.00
Roadway Lighting	0.00	0.00	0.91	3.13	5.37	6.97	6.97	6.97	6.97	6.97	6.97	6.97	6.97	6.97	6.97	6.97	6.97	6.97	6.97	6.97	6.97	6.97	6.97	6.97	6.97	7.94
Sentinel Lighting	0.00	0.00	0.51	1.11	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	2.03
Commercial Air Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.07	0.08	0.11	0.17	0.20	0.23	0.26	0.28	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.33
Agricultural Demand Controller	0.00	0.00	0.68	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.14
Commercial Air Conditioning	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aboriginal Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Parking Lot Controllers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spray Valves	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.27	0.27	0.27	0.27	0.00	0.00
Agricultural Heat Pads	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.66	1.00	1.19	1.59	1.99	2.20	2.61	2.71	2.77	3.24	3.49	3.59	3.87	3.87	4.01	2.98	3.54
Subtotal	0.00	0.00	2.23	5.74	9.00	10.64	10.68	10.75	10.76	11.43	11.80	12.05	12.49	12.91	13.16	13.58	13.69	13.75	14.23	14.66	14.81	15.09	15.09	15.22	13.83	15.91
COMMERCIAL TOTAL	0.00	0.00	2.23	6.28	11.92	16.92	20.49	22.54	24.21	29.08	31.50	33.18	35.23	37.51	42.12	46.37	53.12	60.08	66.59	74.45	82.75	91.34	96.72	111.41	93.78	112.76
INDUSTRIAL																										
Performance Optimization Program	0.00	0.00	0.00	0.00	0.00	0.29	1.08	4.60	5.78	37.36	39.13	39.45	48.40	52.93	54.07	57.64	61.68	63.18	66.25	68.71	72.03	75.49	78.95	80.04	64.93	72.62
Emergency Preparedness Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal	0.00	0.00	0.00	0.00	0.00	0.29	1.08	4.60	5.78	37.36	39.13	39.45	48.40	52.93	54.07	57.64	61.68	63.18	66.25	68.71	72.03	75.49	78.95	80.04	64.93	72.62
DISCONTINUED/COMPLETED																										
Industrial (Basic)	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.00	0.00
Retrofit/Demonstration GSL	0.00	0.00	0.00	0.31	0.38	1.59	4.30	4.30	4.30	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.16	4.16	4.58
High Efficiency Motors	0.00	0.00	0.07	0.73	1.33	1.81	2.30	3.03	3.79	3.79	3.79	3.79	3.79	3.79	3.79	3.79	3.79	3.79	3.79	3.79	3.79	3.79	3.79	3.79	3.79	4.17
Efficient Motors (QMR)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal	0.00	0.00	0.07	1.04	1.74	3.43	6.63	7.36	8.12	8.16	8.16	8.16	8.16	8.16	8.16	8.16	8.16	8.16	8.16	8.16	8.16	8.16	8.16	7.98	7.95	8.74
INDUSTRIAL TOTAL	0.00	0.00	0.07	1.04	1.74	3.72	7.71	11.96	13.90	45.52	47.29	47.61	56.56	61.09	62.23	65.80	69.84	71.34	74.41	76.87	80.19	83.65	87.11	88.02	72.87	81.36
EFFICIENCY PROGRAMS SUBTOTAL	0.29	0.52	3.27	8.62	15.24	22.56	30.26	36.85	40.63	77.14	81.35	83.36	94.90	102.19	108.38	119.39	133.75	147.96	164.39	183.85	208.72	229.55	242.75	259.47	198.77	232.51
CUSTOMER SELF-GENERATION PROGRAMS																										
BioEnergy Optimization Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.30	14.30	14.30	14.30	14.30	14.30	14.35	0.53	0.00	0.58
RATE/LOAD MANAGEMENT PROGRAMS																										
Curtailable Rate Program	0.00	0.00	0.00	0.00	40.70	46.40	24.70	32.70	80.00	48.20	58.00	57.10	68.00	110.28	148.54	153.76	189.07	183.29	180.62	172.76	149.15	154.52	148.59	146.43	0.00	0.00
PROGRAM IMPACTS	0.29	0.52	3.27	8.62	55.94	68.96	54.96	69.55	120.63	125.34	139.35	140.46	162.90	212.47	256.91	273.15	337.12	345.55	359.31	370.90	372.17	398.36	405.68	406.42	198.77	233.09
CODES, STANDARDS & REGULATIONS	0.00	0.00	0.00	0.48	1.60	3.33	5.43	8.41	13.60	20.40	28.00	35.18	42.93	52.01	56.15	61.78	66.95	72.42	78.60	85.12	92.02	99.48	108.37	115.81	115.81	131.92
Total Impact @ Meter	0.29	0.52	3.27	9.10	57.54	72.29	60.38	77.97	134.22	145.74	167.35	175.64	205.83	264.48	313.06	334.93	404.07	417.97	437.91	456.03	464.18	497.85	514.05	522.23	314.58	
Total Impact @ Generation	0.33	0.59	3.72	10.33	63.90	80.40	67.54	87.09	149.25	162.37	186.53	195.99	229.61	294.58	348.38	372.95	449.61	465.62	488.33	509.21	519.31	557.34	575.91	585.84	355.59	365.16

Note: May not add up due to rounding.

** Includes savings for Downtown Office project based on planning assumptions*

2013 - 2016 Power Smart Plan
Annual Energy Savings (GW.h)
(Savings To Date)
(1989/90 - 2012/13)

	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	Interim Estimate 2012/13	Benchmark 2027/28	At Generation 2027/28
RESIDENTIAL																										
Incentive Based																										
Home Insulation Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.74	4.25	10.74	16.49	22.08	28.41	33.75	38.67	41.09	41.09	46.84
Lower Income Energy Efficiency Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55	1.10	1.96	4.23	6.88	8.34	2.92	3.32
New Home Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.63	1.86	2.87	3.68	4.27	5.04	5.50	5.50	5.50	6.27
Refrigerator Retirement Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.02	16.70	0.00	0.00
Water and Energy Saver Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.30	10.54	12.43	0.00	2.16
Subtotal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.83	4.88	12.60	19.92	26.87	34.64	48.32	69.61	84.06	49.51	58.59
Customer Service Initiatives																										
Power Smart Residential Loan Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	1.56	2.16	2.73	3.21	3.86	4.60	5.22	6.87	7.42	7.74	7.99	7.99	9.10
Residential Earth Power Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.99	2.83	4.78	6.14	8.79	10.17	11.22	11.82	12.12	13.15	2.98	7.98
ecoEnergy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.30	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.86
Solar H2O Heater	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.05	0.05	0.05	0.05	0.06
Power Smart PAYS Financing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.33	0.37
Subtotal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	2.02	3.44	6.31	8.75	10.76	14.15	16.15	18.88	20.05	20.67	22.27	12.11	18.38
DISCONTINUED/COMPLETED																										
Appliances	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.55	7.60	12.07	12.75	12.75	12.75	12.75	0.42	0.48
Seasonal LED Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	1.34	2.30	3.07	3.23	3.23	3.23	3.23	0.93	2.15
Outdoor Timer	5.01	8.93	15.34	20.59	24.78	29.22	30.89	34.68	36.48	36.48	36.48	36.48	36.48	36.48	36.48	36.48	36.48	36.48	36.48	36.48	36.48	36.48	36.48	36.48	36.48	41.58
Res Hot Water	0.00	0.00	0.35	0.35	0.35	0.35	0.35	0.36	0.46	0.59	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.56	0.47	0.54
Water Heater Rental	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.25	0.42	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.55
Thermostat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.41
Retrofit/Demonstration	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
RBB	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Efficiency Furnace & Boiler	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.26	1.26	1.26	1.26	1.26	1.44
Energy Efficient Light Fixtures	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	1.03	2.08	2.64	3.68	4.35	4.35	0.99	2.08
Compact Fluorescent Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.09	15.39	20.60	28.09	49.94	77.72	92.07	86.89	79.40	0.00	0.00	0.00
Power Smart Energy Manager	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	1.20	2.38	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.18	1.60	0.00	0.00
R2000 House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.15	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.22
Subtotal	5.01	8.93	15.70	20.96	25.15	29.59	31.26	35.12	37.20	37.49	37.58	37.58	38.30	38.93	40.15	48.66	56.04	66.50	79.95	108.10	138.52	153.91	148.79	140.67	41.60	49.45
RESIDENTIAL TOTAL	5.01	8.93	15.70	20.96	25.15	29.59	31.26	35.12	37.20	37.49	37.58	37.58	39.21	40.96	43.59	56.80	69.67	89.87	114.02	151.11	192.05	222.28	239.07	246.99	103.21	126.43
COMMERCIAL																										
Incentive Based																										
Commercial Lighting Program	0.00	0.00	0.00	2.92	16.99	35.90	55.00	61.23	67.45	85.39	90.76	94.88	100.18	105.59	116.21	132.57	153.14	175.81	193.92	218.90	239.47	258.75	283.92	295.79	253.69	310.67
Commercial Earth Power Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	1.12	1.79	2.86	3.23	4.02	5.05	7.76	8.75	11.12	15.30	18.63	20.21	23.61	25.99	27.59	28.74	22.40	29.81
Commercial Insulation Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	1.87	4.07	6.55	9.73	12.49	14.13	14.13	16.11
Commercial Windows Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.35	0.56	0.67	0.89	1.02	1.37	1.79	2.29	3.19	3.95	4.46	5.23	7.29	9.67	12.47	13.98	13.27	15.13
Internal Retrofit Program	0.00	0.00	0.00	0.17	1.23	2.73	3.29	3.77	4.26	4.95	5.44	5.85	6.14	6.89	9.38	12.15	14.42	16.98	18.03	19.82	21.47	24.05	35.32*	35.81	35.24	40.18
Commercial Custom Measures Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.38	2.58	10.00	10.75	11.70	12.16	12.77	12.83	12.85	13.14	15.39	15.91	17.36	18.82	20.11	20.72	19.39	22.10
Commercial Refrigeration Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.22	3.05	4.26	5.53	6.97	8.85	9.51	3.45	3.93
Commercial HVAC Program - Chiller	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.46	3.66	4.10	4.28	4.85	5.34	7.10	8.28	8.63	8.63	9.84
City of Winnipeg Power Smart Agreement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.63	1.17	7.61	9.60	10.12	10.34	10.83	11.15	11.57	11.76	0.97	1.29
Commercial Clothes Washers Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.32	0.38	0.47	0.54	0.00	0.00
Commercial Kitchen Appliance Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.47	0.60	0.71	0.76	0.00	0.00
Power Smart Shops	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.69	0.69	0.69	0.00	0.00
Commercial Building Optimization Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.62	0.88	0.88	1.41	0.00	0.00
Network Energy Management Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.18	0.18	0.70	0.00	0.00
New Buildings Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.70	6.62	6.62	7.54
CO2 Sensors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.11	0.18	0.00	0.00
Power Smart Energy Manager Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal	0.00	0.00	0.00	3.09	18.23	38.63	58.29	65.81	73.56	95.27	109.74	115.61	123.06	131.13	148.53	172.23	205.99	240.70	269.74	304.26	339.17	374.99	390.01	449.98	377.79	456.60
Customer Service Initiatives																										
Power Smart for Business PAYS Financing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DISCONTINUED/COMPLETED																										
Commercial Showerhead	0.00	0.00	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.64
Infrared Heat Lamp	0.00	0.00	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	4.24
Livestock Waterer	0.00	0.00	0.00	0.00	0.00	0.17	0.31	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.00	0.00
Roadway Lighting	0.00	0.00	3.88	13.50	23.16	29.85	29.85	29.85	29.85	29.85	29.85	29.85	29.85	29.85	29.85	29.85	29.85	29.85	29.85	29.85	29.85	29.85	29.85	29.85	29.85	34.03
Sentinel Lighting	0.00	0.00	2.25	4.73	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	8.55
Commercial Air Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.18	0.20	0.28	0.45	0.55	0.63	0.72	0.75	0.78	0.78	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.95
Agricultural Demand Controller	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial Air Conditioning	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.04	0.20	0.20	0.29	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.28	0.32
Aboriginal Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Parking Lot Controllers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.76	1.62	3.67	4.10	4.40	5.94	6.76	8.80	11.50	19.96	27.93	30.46	32.43	34.88	38.11	39.38	41.10	21.64	26.63
Spray Valves	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.90	2.88	4.79	5.17	5.17	5.17	5.17	0.00	0.00
Agricultural Heat Pads	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.51	5.51	6.68	9.23	11.59	12.90	15.39	16.39	17.03	21.75	24.30	25.41	28.37	28.37	29.38	19.01	22.82
Subtotal	0.00	0.00	11.30	23.39	35.82	42.68	42.83	43.81	44.70	50.27	52.79	54.41	58.64	62.06	65.51	70.82	80.32	90.84	99.12	105.55	109.49	115.68	116.95	119.68	84.28	99.18
COMMERCIAL TOTAL	0.00	0.00	11.30	26.48	54.04	81.31	101.11	109.62	118.26	145.55	162.53	170.02	181.70	193.19	214.04	243.05	286.31	331.54	368.87	409.81	448.66	490.67	506.96	569.66	462.07	555.78
INDUSTRIAL																										
Performance Optimization Program	0.00	0.00	0.00	0.00	0.00	2.42	7.21	35.10	43.52	85.88	107.70	110.85	142.93	170.52	181.46	207.61	238.59	249.35	276.39	294.86	319.61	347.88	373.07	380.04	256.06	299.85
Emergency Preparedness Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal	0.00	0.00	0.00	0.00	0.00	2.42	7.21	35.10	43.52	85.88	107.70	110.85	142.93	170.52	181.46	207.61	238.59	249.35	276.39	294.86	319.61	347.88	373.07	380.04	256.06	299.85
DISCONTINUED/COMPLETED																										
Industrial (Basic)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00
Retrofit/Demonstration GSL	0.00	0.00	0.00	0.07	0.67	9.67	32.72	32.72	32.72	33.07	33.07	33.07	33.07	33.07	33.07	33.07	33.07	33.07	32.99	32.99	32.99	32.99	32.99	32.99	32.98	37.60
High Efficiency Motors	0.00	0.00	0.40	4.79	7.65	10.34	13.30	17.88	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	21.48	24.49
Efficient Motors (QMR)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal	0.00	0.00	0.40	4.87	8.33	20.02	46.02	50.61	54.21	54.56	54.56	54.56	54.56	54.56	54.56	54.56	54.56	54.56	54.48	54.48	54.48	54.48	54.48	54.48	54.46	62.09
INDUSTRIAL TOTAL	0.00	0.00	0.40	4.87	8.33	22.44	53.23	85.71	97.73	140.44	162.25	165.41	197.49	225.08	236.02	262.17	293.15	303.90	330.87	349.35	374.10	402.37	427.55	434.52	310.53	361.94
EFFICIENCY PROGRAMS SUBTOTAL	5.01	8.93	27.40	52.31	87.52	133.34	185.60	230.45	253.19	323.48	362.36	373.01	418.39	459.23	493.64	562.03	649.13	725.32	813.76	910.27	1,014.81	1,115.32	1,173.59	1,251.17	875.80	1,044.15
CUSTOMER SELF-GENERATION PROGRAMS																										
BioEnergy Optimization Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.26	120.06	84.21	94.01	80.08	86.56	70.27	4.61	0.00	5.26
RATE/LOAD MANAGEMENT PROGRAMS																										
Curtailable Rate Program	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PROGRAM IMPACTS	5.01	8.93	27.40	52.31	87.52	133.34	185.60	230.45	253.19	323.48	362.36	373.01	418.39	459.23	493.64	562.03	659.39	845.38	897.97	1,004.28	1,094.89	1,201.88	1,243.86	1,255.79	875.80	1,049.41
CODES, STANDARDS & REGULATIONS	0.00	0.00	0.00	1.94	6.59	13.73	22.35	35.19	55.52	81.51	110.09	137.26	166.49	200.72	217.58	240.50	261.85	284.34	309.12	335.24	377.80	422.85	472.78	505.40	505.40	575.50
Total Impact @ Meter	5.01	8.93	27.40	54.25	94.11	147.07	207.95	265.64	308.71	404.98	472.45	510.27	584.89	659.94	711.22	802.53	921.24	1,129.72	1,207.10	1,339.52	1,472.69	1,624.73	1,716.63	1,761.18	1,381.20	
Total Impact @ Generation	5.71	10.18	31.22	61.64	106.95	166.77	234.93	299.40	347.96	455.93	531.90	574.83	658.55	742.94	800.89	903.87	1,037.49	1,270.27	1,358.84	1,508.67	1,660.05	1,831.98	1,936.40	1,989.53	1,561.50	1,612.03

Note: May not add up due to rounding.

** Includes savings for Downtown Office project based on planning assumptions*

Economic Effectiveness Metrics

Manitoba Hydro uses a number of cost effective metrics to assess energy efficient opportunities, including whether to pursue an opportunity, how aggressively an opportunity will be pursued, effectiveness of program design options and the relative investment from ratepayers and participants. In addition to quantitative assessments, Manitoba Hydro also considers various qualitative factors including equity (i.e. reasonable participation by various ratepayer sectors such as lower income) and overall contribution towards having a balanced energy conservation strategy and plan.

Quantitative assessments include using the following cost effective metrics:

Integrated Metrics

- Societal Cost (SC);
- Total Resource Cost (TRC);
- Total Resource Cost NPV (TRC NPV);
- Levelized Resource Cost (LRC)

Utility Metrics

- Rate Impact Measure Cost (RIM);
- Net Utility Benefit (NUB);
- Utility Net Present Value (Utility NPV)
- Levelized Utility Cost (LUC);

Customer Metrics

- Simple Customer Payback calculation;
- Participating Customer Cost (PC); and
- Participating Customer Cost Net Present Value (PC NPV).

Integrated Metrics

Societal Cost (SC)

The Societal Cost (SC) metric measures the net economic benefit as measured by the TRC, plus additional indirect benefits such the avoided environmental or societal externalities (e.g. reduced health care costs, increase productivity, employment) and "non-priced" benefits enjoyed by participants (improved comfort, improved heath).

$$SC = \frac{(PV\ (Marginal\ Benefits) \times 1.10) + PV\ (Measurable\ Non\text{-}Energy\ benefits)}{PV\ (Total\ Program\ Admin\ Costs + Incremental\ Product\ Costs)}$$

Where:

- For electricity, the Marginal Benefits includes the revenue realized by Manitoba Hydro from conserved electricity being sold in the export market, the avoided cost of new infrastructure (e.g. electric transmission facilities)

- Measurable non-energy benefits (e.g. water savings);

- For natural gas, the Marginal Benefits includes Manitoba Hydro's avoided cost of purchasing natural gas, avoided transportation costs, the value of reduced greenhouse gas emissions (GHGs) and measurable non-energy benefits (e.g. water savings);

- Total Program Admin Costs includes the administrative costs involved in program planning, design, marketing, implementation and evaluation. It includes all costs associated with offering the Power Smart program, except for customer incentive costs;

- Incremental Product Costs includes the total incremental cost associated with implementing an energy efficient opportunity. It is the difference in costs between the energy efficient technology and the standard technology that would have been installed in the absence of the program.

Total Resource Cost (TRC)

The Total Resource Cost (TRC) metric assesses whether the benefits that are associated with an energy efficiency program are greater than the costs. This assessment is undertaken irrespective of who realizes the benefits and who pays the costs with any economic transfers between the Corporation and the participating customer being excluded.

In general, if program offers greater benefits relative to costs, then a program for pursuing the opportunity should be considered, however Manitoba Hydro will also consider supporting certain programs where the benefits are less than the costs. In the latter case, the rationale driving the support will be driven by other qualitative factors such as supporting emerging technologies (e.g. solar panels) or targeting low participation market sectors (e.g. lower income). The Total Resource Cost metric is defined as follows:

$$\text{TRC} = \frac{\text{PV (Marginal Benefits) + PV (Measurable Non-Energy Beneftits)}}{\text{PV (Total Program Admin Costs + Incremental Product Costs)}}$$

Where:

- For electricity, the Marginal Benefits includes the revenue realized by Manitoba Hydro from conserved electricity being sold in the export market, the avoided cost of new infrastructure (e.g. electric transmission facilities);
- Measurable non-energy benefits (e.g. water savings);
- For natural gas, the Marginal Benefits includes Manitoba Hydro's avoided cost of purchasing natural gas, avoided transportation costs, the value of reduced greenhouse gas emissions (GHGs) and measurable non-energy benefits (e.g. water savings);
- Total Program Admin Costs includes the administrative costs involved in program planning, design, marketing, implementation and evaluation. It includes all costs associated with offering the Power Smart program, except for customer incentive costs;
- Incremental Product Costs includes the total incremental cost associated with implementing an energy efficient opportunity. It is the difference in costs between the energy efficient technology and the standard technology that would have been installed in the absence of the program.

Total Resource Cost Net Present Value (TRC NPV)

The Total Resource Cost Net Present Value (TRC NPV) calculation reveals if the economic value of the benefits that are associated with an energy efficiency program are greater than the costs.

$$\text{TRC NPV} = \text{PV (Marginal Benefits) - PV (Total Program Admin Costs + Incremental Product Costs)}$$

Where:

- For electricity, the Marginal Benefits includes the revenue realized by Manitoba Hydro from conserved electricity being sold in the export market, the avoided cost of new infrastructure (e.g. electric transmission facilities) and measurable non-energy benefits (e.g. water savings);
- For natural gas, the Marginal Benefits includes Manitoba Hydro's avoided cost of purchasing natural gas, avoided transportation costs, the value of reduced greenhouse gas emissions (GHGs) and measurable non-energy benefits (e.g. water savings);
- Total Program Admin Costs includes the administrative costs involved in program planning, design, marketing, implementation and evaluation. It includes all costs associated with offering the Power Smart program, except for customer incentive costs;
- Incremental Product Costs includes the total incremental cost associated with implementing an energy efficient opportunity. It is the difference in costs between the energy efficient technology and the standard technology that would have been installed in the absence of the program.

Levelized Resource Cost (LRC)

The Levelized Resource Cost (LRC) is used to determine the overall economic resource cost of energy saved through an energy efficiency program. The LRC provides a levelized cost of energy saved per unit over a fixed time period. The Levelized Resource Cost is defined as follows:

$$LRC = \frac{PV\ (\text{Incremental Product Costs} + \text{Total Program Admin Costs})}{PV\ (\text{Energy})}$$

Where:

- Incremental Product Costs includes the total incremental cost associated with implementing an energy efficient opportunity. It is the difference in costs between the energy efficient technology and the standard technology that would have been installed in the absence of the program.

- Utility Program Admin Costs includes administrative costs incurred by Manitoba Hydro for staff involved in program planning, design, marketing, implementation and evaluation. It includes all costs associated with offering the Power Smart program, except for customer incentive costs;

- Energy includes the annual energy savings.

Utility Metrics

Rate Impact Measure Cost(RIM)

The Rate Impact Measure (RIM) metric is used to provide an indication of the long term impact of an energy efficient program on energy rates. The metric is a benefit/cost ratio that represents the economic impact of a program from the ratepayer's perspective. All program related savings and costs incurred by the utility, including revenue loss and incentive payments, are taken into account in this assessment. The Rate Impact Measure metric is defined as follows:

$$\text{RIM} = \frac{\text{PV (Utility Marginal Benefits)}}{\text{PV (Revenue Loss + Utility Program Admin Costs + Incentives)}}$$

Where:

- For electricity, the Utility Marginal Benefits includes the revenue realized by Manitoba Hydro from conserved electricity being sold in the export market and the avoided cost of new infrastructure (e.g. electric transmission facilities);
- For natural gas, the Utility Marginal Benefits includes Manitoba Hydro's avoided cost of purchasing natural gas and avoided transportation costs;
- Revenue Loss includes Manitoba Hydro's lost revenue associated with the participants' reduced energy consumption (i.e. customer energy bill reductions);
- Utility Program Admin Costs includes administrative costs incurred by Manitoba Hydro for staff involved in program planning, design, marketing, implementation and evaluation. It includes all costs associated with offering the Power Smart program, except for customer incentive costs;
- Incentives include the funds transferred from Manitoba Hydro to the participant associated with implementing the Power Smart measure.

Net Utility Benefit (NUB)

The Net Utility Benefit (NUB) metric is used to measure the energy saving benefits to the utility net of any revenue losses. Marginal benefits, after deductions from lost revenue are compare to the cost incurred by the by the utility. The Net Utility Benefit metric is defined as follows:

$$\text{NUB} = \frac{\text{PV (Utility Marginal Benefits) - PV (Revenue Loss)}}{\text{PV (Utility Program Admin Costs + Incentives)}}$$

Where:

- For electricity, the Utility Marginal Benefits includes the revenue realized by Manitoba Hydro from conserved electricity being sold in the export market and the avoided cost of new infrastructure (e.g. electric transmission facilities);
- For natural gas, the Utility Marginal Benefits includes Manitoba Hydro's avoided cost of purchasing natural gas and avoided transportation costs;
- Revenue Loss includes Manitoba Hydro's lost revenue associated with the participants' reduced energy consumption (i.e. customer energy bill reductions);
- Utility Program Admin Costs includes administrative costs incurred by Manitoba Hydro for staff involved in program planning, design, marketing, implementation and evaluation. It includes all costs associated with offering the Power Smart program, except for customer incentive costs;
- Incentives include the funds transferred from Manitoba Hydro to the participant associated with implementing the Power Smart measure.

Utility Net Present Value (Utility NPV)

The Utility Net Present Value (Utility NPV) calculation reveals from the Utility's perspective, if the economic value of the benefits that are associated with an energy efficiency program are greater than the costs.

Utility NPV = PV (Marginal Benefits – Revenue Loss) - PV (Utility Program Admin Costs + Incentives)

Where:

- For electricity, the Utility Marginal Benefits includes the revenue realized by Manitoba Hydro from conserved electricity being sold in the export market and the avoided cost of new infrastructure (e.g. electric transmission facilities);
- For natural gas, the Utility Marginal Benefits includes Manitoba Hydro's avoided cost of purchasing natural gas and avoided transportation costs;
- Revenue Loss includes Manitoba Hydro's lost revenue associated with the participants' reduced energy consumption (i.e. customer energy bill reductions);
- Utility Program Admin Costs includes administrative costs incurred by Manitoba Hydro for staff involved in program planning, design, marketing, implementation and evaluation. It includes all costs associated with offering the Power Smart program, except for customer incentive costs;
- Incentives include the funds transferred from Manitoba Hydro to the participant associated with implementing the Power Smart measure.

Levelized Utility Cost (LUC)

The Levelized Utility Cost (LUC) is used to provide an economic cost value for the energy saved through an energy efficiency program. The LUC provides the total cost of the conserved energy based upon the utility's investment on behalf of the ratepayer on a per unit basis levelized over a fixed time period. The cost value allows for a comparison to other supply options and other DSM programs occurring over different timeframes. The Levelized Utility Cost is defined as follows:

$$\text{LUC} = \frac{\text{PV (Utility Program Admin Costs + Incentives)}}{\text{PV (Energy)}}$$

Where:

- Utility Program Admin Costs includes administrative costs incurred by Manitoba Hydro for staff involved in program planning, design, marketing, implementation and evaluation. It includes all costs associated with offering the Power Smart program, except for customer incentive costs;

- Incentives includes the funds transferred from Manitoba Hydro to the participant associated with implementing the Power Smart measure;

- Energy includes the annual energy savings.

Customer Metrics

Simple Customer Payback Calculation (Payback)

The Simple Customer Payback calculation provides the simple payback of implementing an energy efficient opportunity for customers. This value outlines the amount of time required before the customer recovers the incremental product cost. The value is useful in projecting customer participation rates for energy efficient opportunities. The Customer Payback is defined as follows:

$$CP = \frac{\text{Participant Costs - Incentives}}{\text{Annual Bill Reductions}}$$

Where:

- Participant Costs includes the participant's total incremental cost associated with implementing the energy efficient opportunity, which is the difference in costs between the energy efficient technology and the standard technology that would have been installed in the absence of the program.
- Incentives includes funds provided by Manitoba Hydro and external parties to the participant associated with implementing the energy efficient opportunity;
- Annual Bill Reductions include the first year dollar reductions in the customer's electricity, natural gas, and water bills.

Participating Customer Cost (PC)

The Participating Customer Cost (PC) metric evaluates from a customer perspective if the benefits that are associated with an energy efficiency program are greater than the costs over the life of the measure. The Participating Customer Cost is defined as follows:

$$PC = \frac{\text{PV (Incentives + Revenue Loss)}}{\text{PV (Incremental Product Costs)}}$$

Where:

- Incentives include the funds transferred from Manitoba Hydro to the participant associated with implementing the Power Smart measure.
- Revenue Loss includes Manitoba Hydro's lost revenue associated with the participants' reduced energy consumption (i.e. customer energy and measurable non-energy (i.e. water) bill reductions);
- Incremental Product Costs includes the total incremental cost associated with implementing an energy efficient opportunity. It is the difference in costs between the energy efficient technology and the standard technology that would have been installed in the absence of the program.

Participating Customer Cost Net Present Value (PC NPV)

The Participating Customer Cost Net Present Value (PC NPV) calculation reveals from the customer's perspective, if the economic value of the benefits that are associated with an energy efficiency program are greater than the costs over the life of the measure.

$$\text{PC NPV} = \text{PV (Incentives + Revenue Loss)} - \text{PV (Incremental Product Costs)}$$

Where:

- Incentives include the funds transferred from Manitoba Hydro to the participant associated with implementing the Power Smart measure.
- Revenue Loss includes Manitoba Hydro's lost revenue associated with the participants' reduced energy consumption (i.e. customer energy and measurable non-energy (i.e. water) bill reductions);
- Incremental Product Costs includes the total incremental cost associated with implementing an energy efficient opportunity. It is the difference in costs between the energy efficient technology and the standard technology that would have been installed in the absence of the program.

Other DSM Program Assumptions

Market Transformation

Market transformation is a strategic intervention to achieve a lasting, significant share of energy efficient products and services in targeted markets. Manitoba Hydro's Power Smart strategy focuses on creating a sustainable market change where energy efficient technologies and practices become the market standard.

However, market transformation is difficult to measure. Manitoba Hydro has made significant progress in developing specific methodologies for measuring its impacts. Wherever possible, Manitoba Hydro has attempted to obtain sales/technology specific data to calculate a program's true effect. Difficulties arise in 1) obtaining sales data for areas outside of Manitoba for comparison purposes and in 2) obtaining sales information for Manitoba that fall outside of Power Smart program participation. In some instances, qualitative information is used to determine a program's impact on the market. Manitoba Hydro plans to continue work to further quantify and report on the influence of market transformation within the Manitoba marketplace.

For the 2013-16 Power Smart Plan, the DSM programs that have assumed a future level of market transformation have been noted.

Participant Reinvestment

Participant reinvestment is a marketing assumption which measures the program's influence on a participant's decision to repurchasing the energy efficient technology once the initial product life of the energy efficient technology has ended.

For the 2013-16 Power Smart Plan, the DSM programs that have assumed a future level of participant reinvestment have been noted.

TAB 2

DSM Options: Additional Evaluations for March 10

DSM Options 2027/2028 Energy levels	Preferred Plan Keeyask Conawapa 750 MW	Keeyask Gas 750 MW	All Gas Plan
2013 DSM 773 GWh (1 X DSM)	X		X
2014 Option 1 1,704 GWh (2 X DSM)	X		
2014 Option 2 2,961 GWh (4 X DSM)	X	March 10 or later	March 10 or later
2014 Option 3 3,546 GWh (5 X DSM)	X	X	X

- 2013 Load Forecast & associated assumptions
- Options 2 & 3 repeated with 1300 GWh pipeline load added to 2013 Load Forecast

TAB 3

Load Variability

Uncertainty is an inherent characteristic of forecasting. The load will vary both year to year and long term because of underlying changes in population growth, economic growth, changes in the operations of Top Consumers, and overall use patterns. An economic recession will slow energy growth. An economic boom will increase it. Cycles cannot be predicted in advance so some appropriate midpoint must be chosen as the forecast.

This forecast was created as Manitoba Hydro's best estimate of Manitoba's future energy requirement. The expectation is that there will be a 50% chance that actual growth will be higher than the forecast, and a 50% chance that actual growth will be lower than the forecast.

To evaluate the potential for variation, historic load variability has been analyzed using a probabilistic-based approach. Variations in annual weather adjusted load that have occurred in the past are used to estimate future variation. Doing this provides an estimate of the magnitude of the potential load variation from the forecast due to population, economy and other effects. 10% and 90% confidence bands (-/+ 1.28 standard deviations) were selected to be a proxy for the Low and High Load Forecast Scenarios for use in risk analysis studies. They are calculated as follows:

Load = Base Forecast -/+ 1.28 x Standard Deviation

For other probability points, substitute for the 1.28 the following numbers:

Prob	0.1%	2.5%	10%	20%	50%	80%	90%	97.5%	99.9%
Z(Prob)	-3.09	-1.96	-1.28	-0.84	0.00	0.84	1.28	1.96	3.09

This calculation gives the variability due to long term economic effects. It does not include variability due to weather which was removed through the use of weather adjusted load.

If variability due to weather is needed, the standard deviation of annual energy or annual peak due to weather has been found to be approximately 2% of the load. This 2% of load can be used as the standard deviation in a probability point calculation. The resulting variance can be added to the economic-based variance if a combined variance is needed. A straight addition of variances can be done because the weather is mostly independent of the economy.

The following four charts and tables summarize the variability for energy and peak. By 2032/33, the Load Forecast has an 80% probability of being accurate to within ±2,471 GW.h or ±7.6%. Due to the inherent variability of the load, this is the best level of accuracy possible.

Figure 20 - Energy Variability

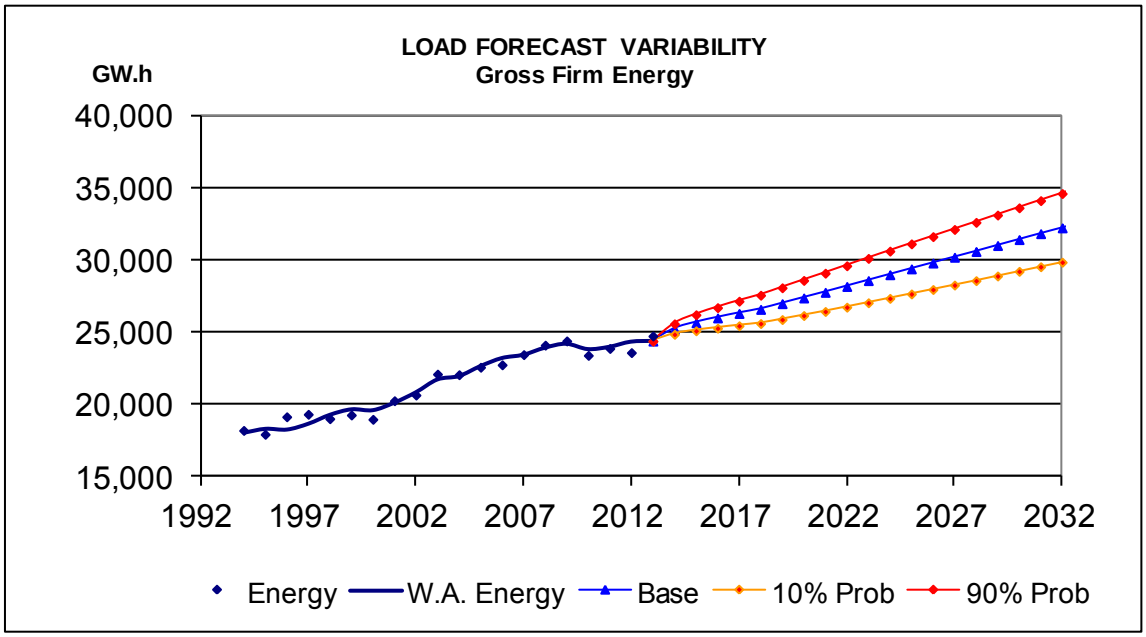


Table 33 – Energy Variability

Fiscal Year	Gross Firm Base Fcst	Long Term Economic Std Dev	10.0% Prob Point	90.0% Prob Point
2013/14	25239	284	24875	25603
2014/15	25676	434	25119	26232
2015/16	26013	557	25299	26727
2016/17	26322	667	25468	27176
2017/18	26606	767	25623	27589
2018/19	27003	862	25898	28107
2019/20	27398	951	26178	28617
2020/21	27789	1038	26460	29119
2021/22	28197	1121	26761	29634
2022/23	28605	1202	27065	30145
2023/24	29013	1280	27372	30654
2024/25	29418	1357	27679	31157
2025/26	29822	1433	27986	31658
2026/27	30225	1507	28295	32156
2027/28	30625	1579	28602	32649
2028/29	31041	1651	28925	33156
2029/30	31453	1721	29246	33659
2030/31	31863	1791	29568	34159
2031/32	32265	1860	29882	34649
2032/33	32667	1928	30196	35138

Figure 21 - Peak Variability

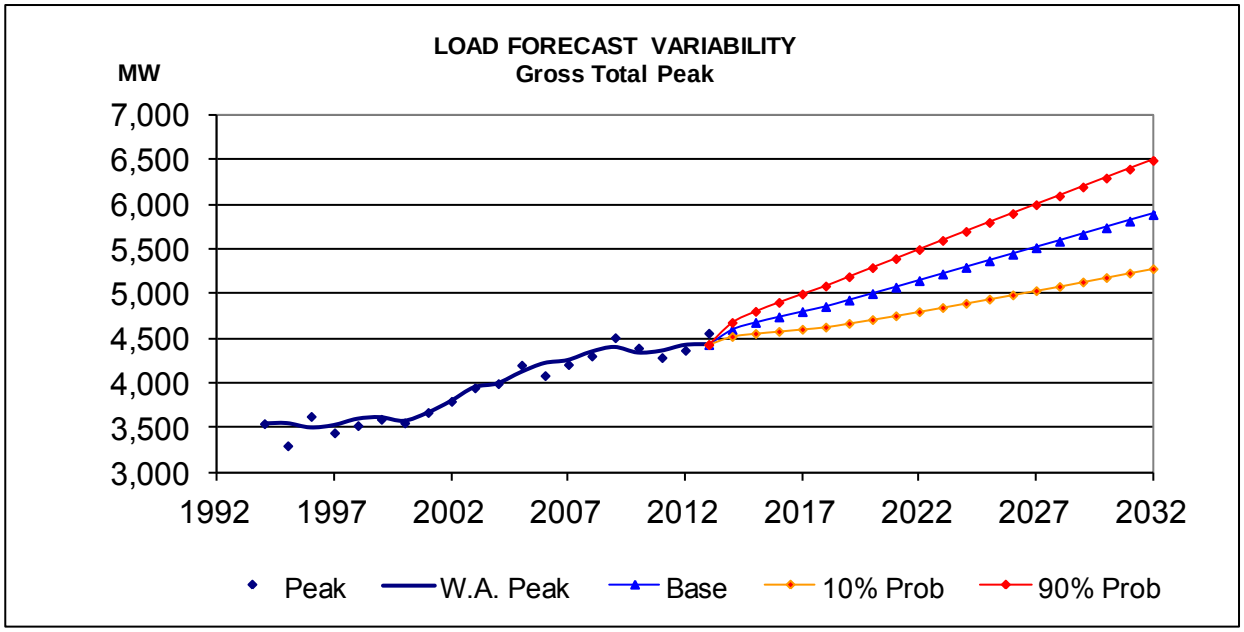


Table 34 – Peak Variability

Fiscal Year	Gross Total Peak Base Fcst	Long Term Economic Std Dev	10.0% Prob Point	90.0% Prob Point
2013/14	4601	61	4522	4679
2014/15	4680	97	4556	4804
2015/16	4742	127	4579	4904
2016/17	4801	154	4603	4998
2017/18	4857	179	4628	5087
2018/19	4930	204	4669	5191
2019/20	5002	227	4711	5293
2020/21	5074	249	4754	5393
2021/22	5147	271	4800	5495
2022/23	5222	293	4846	5597
2023/24	5296	314	4893	5698
2024/25	5369	335	4940	5798
2025/26	5443	355	4988	5898
2026/27	5516	375	5035	5997
2027/28	5588	395	5082	6095
2028/29	5664	415	5132	6195
2029/30	5739	434	5182	6295
2030/31	5813	454	5232	6395
2031/32	5886	473	5280	6492
2032/33	5959	492	5329	6590

2004/05 Load Forecast - CAC/MSOS/MH I-9 from Application for General Rate Increase as approved conditionally in Board Order 101-04.

Figure 19

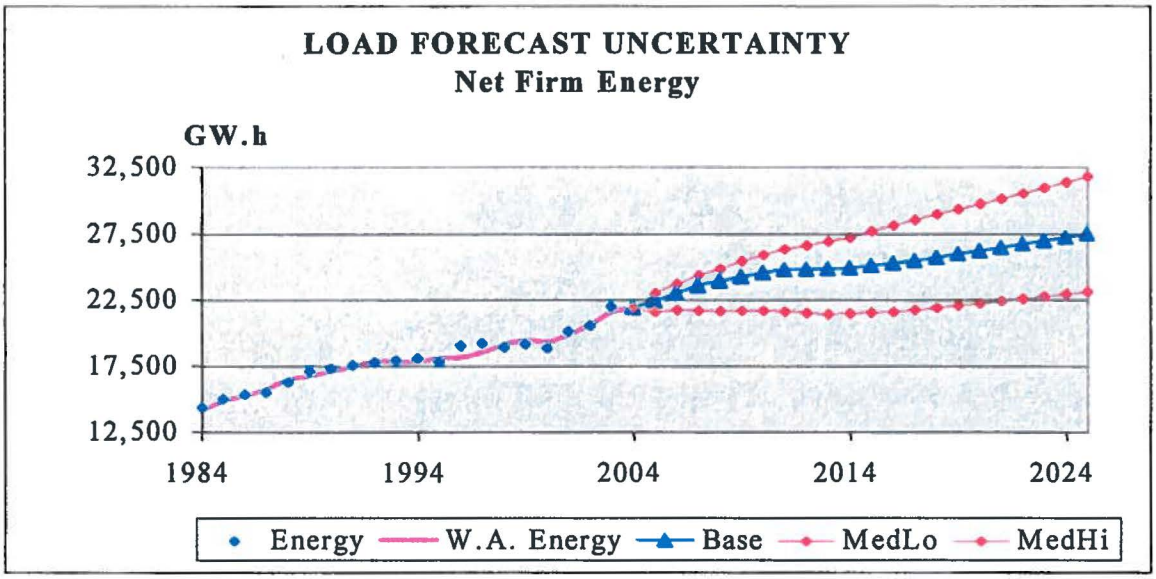


Table 23

Fiscal Year	Net Firm Energy Base Fcst	Wthr and Misc Std Dev	Econ and Model Std Dev	Total Std Dev	95% Lower Conf. Intrvl. (LCL)	Net Firm Energy MedLo Scenario	Net Firm Energy MedHi Scenario	95% Upper Conf. Intrvl. (UCL)	Prob. Actual > MedLo	Prob. Actual > MedHi
2004/05	22371	230	268	353	21679	21594	23005	23063	98.6%	3.6%
2005/06	22941	231	451	506	21949	21743	23698	23934	99.1%	6.7%
2006/07	23491	229	578	622	22273	21693	24366	24710	99.8%	8.0%
2007/08	23858	229	682	720	22447	21645	24825	25268	99.9%	9.0%
2008/09	24184	230	772	806	22605	21691	25425	25764	99.9%	6.2%
2009/10	24488	230	853	884	22756	21692	25880	26220	99.9%	5.8%
2010/11	24719	230	927	955	22847	21617	26300	26590	99.9%	4.9%
2011/12	24746	230	995	1021	22744	21508	26571	26747	99.9%	3.7%
2012/13	24787	231	1059	1084	22663	21422	26868	26912	99.9%	2.7%
2013/14	24856	232	1119	1143	22615	21465	27180	27096	99.8%	2.1%
2014/15	25041	234	1176	1199	22690	21514	27644	27392	99.8%	1.5%
2015/16	25224	235	1231	1253	22768	21562	28074	27680	99.8%	1.1%
2016/17	25408	237	1283	1305	22850	21727	28497	27965	99.8%	0.9%
2017/18	25649	239	1333	1355	22994	21893	28919	28304	99.7%	0.8%
2018/19	25916	241	1382	1402	23168	22061	29291	28665	99.7%	0.8%
2019/20	26152	243	1428	1449	23313	22230	29677	28992	99.7%	0.7%
2020/21	26411	245	1474	1494	23483	22401	30068	29338	99.6%	0.7%
2021/22	26661	247	1517	1537	23648	22572	30490	29675	99.6%	0.6%
2022/23	26915	248	1560	1580	23819	22745	30917	30011	99.6%	0.6%
2023/24	27177	249	1602	1621	24001	22919	31347	30354	99.6%	0.5%
2024/25	27440	251	1642	1661	24184	23094	31782	30695	99.6%	0.4%

Table 1: Manitoba Hydro Load Forecast – Uncertainty Range Calculation 2004/05 Load Forecast vs. 2013/14 Load Forecast

Forecast Year	Firm Energy Base Forecast (GWh)	95% Lower Confidence Interval (GWh)	Medium Low Scenario/10% Prob. Point (GWh)	Medium High Scenario/90% Prob. Point (GWh)	95% Upper Confidence Interval (GWh)
2004/05 Forecast					
2013/14 – 10th year	24,856	(22,615 - 24,856) /24,856 = **-9.0%**	(21,465 - 24,856) /24,856 =**-13.6%**	(27,180 - 24,856) /24,856 =**9.4%**	(27,096 - 24,856) /24,856 =**9.0%**
2024/25 – 21st year	27,440	(24,184 - 27,440) /27,440 = **-11.9%**	(23,094 - 27,440) /27,440 = **-15.8%**	(31,782 - 27,440) /27,440 =**15.8%**	(30,695 - 27,440) /27,440 =**11.9%**
2013/14 Forecast					
2022/23 – 10th year	28,605	n/a	(27,065 - 28,605) /28,605 = **-5.4%**	(30,145 - 28,605) /28,605 =**5.4%**	n/a
2032/33 – 20th year	32,667	n/a	(30,196 – 32,667) /32,667 = **-7.6%**	(35,138 – 32,667) /32,667 =**7.6%**	n/a

Sources:

2004/05 Electric Load Forecast, page 52, CAC-MSOS-MH I-9 from the Application for General Rate Increase as approved conditionally in Board order 101-04, 10th and 21st forecast years (2013/14 and 2024/25).

2013 Electric Load Forecast, pages 45, Appendix D from the NFAT Application, 10th and 20th forecast years (2022/23 and 2032/33)

TAB 4

This characterization by Elenchus is not reflective of the intent of the Surplus Energy program. The program is not an initiative aimed at reducing customer load on the Manitoba Hydro system and should therefore not be viewed as a demand-side management initiative.

The Surplus Energy program provides commercial and industrial customers with the opportunity to purchase energy that is otherwise surplus to Manitoba Hydro's domestic and firm export requirements on terms that are comparable to those obtained through opportunity sales or the incremental marginal value of that surplus energy in instances where transmission constraints preclude access to the opportunity market. As such, the terms and conditions of these purchases reflect the nature of an interruptible opportunity sale.

In recent history, such purchases have been made available at a value that has been lower than the firm domestic rates these customers are charged for firm supply due to the lower value of opportunity sales. Typical use of surplus energy is for electric space-heating applications in circumstances where the customer has an available alternate energy supply should surplus sales be interrupted. Customers are not required to nominate energy purchases in advance and prices are posted in advance on a weekly basis.

Manitoba Hydro does not include the Surplus Energy Program in its assessment and development of its Resource Plan or in its DSM savings.

3.9 Curtailable Rates Program

Elenchus appears to have misinterpreted the operation of Manitoba Hydro's DSM Curtailable Rate Program as it asserts in its report (Page 8, Lines 5 – 6) that customers are only approached by Manitoba Hydro during times of constraint caused by low water levels.

The intent and purpose behind the Curtailable Rates Program is to maintain generation reserves, thereby minimizing disruptions to firm customers in the event of loss of generation or transmission, or an unexpected increase in firm load. A secondary objective is to fulfill Manitoba Hydro's commitment to maintain a specific level of planning reserves and operating reserves as part of it reliability obligations with the Mid-Continental Power Pool – Generation Reserve Sharing Pool. The frequency and duration of curtailments allowed under the program do not make it an effective tool for addressing constraints

caused by low water conditions, which generally have a longer term influence that cannot be fully addressed with frequency and duration of curtailments allowed under the program.

Elenchus' focus on enhanced export sales as the primary outcome of the Curtailable Rates Program (Page 10, Lines 17 – 20 and Lines 27 – 29) does not reflect the intent and purpose of the program. The quantity of energy that is made available through curtailments facilitated under the program is not sufficient to materially change the amount of energy available for export.

Manitoba Hydro does not include the demand benefits available from the Curtailable Rates Program in the assessment and development of its Resource Plan.

3.10 Time-of-Use Rates and Behind-the-Meter Concepts for Large Customers

In its report (Page 27, Lines 12 – 15) on Manitoba Hydro DSM initiatives, Elenchus indicates that:

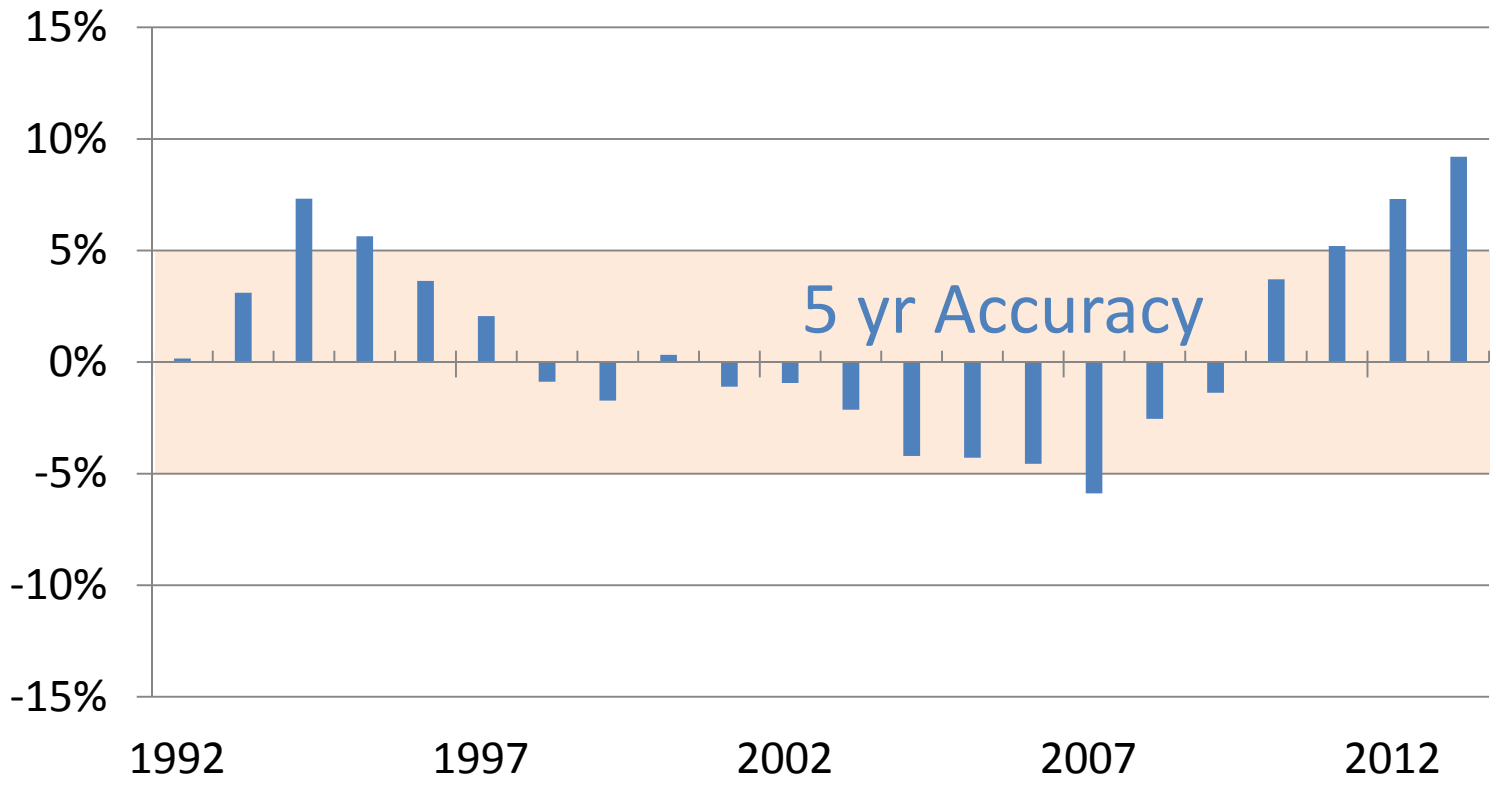
> *"Similarly MH has studied the use of Time-of-Use (TOU) rates and does not support their introduction, nor Demand reduction programs or associated concepts ("behind-the-meter" services). (MH does not offer TOU rates to even large consumers, a reflection of the exceptional low cost of electricity in Manitoba)"*

Manitoba Hydro has studied the use of Time-of-Use (TOU) rates for large consumers and submitted an application to introduce Time-of-Use rates for all General Service Large customers served at 30 kV and above during its last General Rate Application (GRA). This will be the subject of a future hearing.

Similarly, Manitoba Hydro is evaluating the implementation of a behind-the-meter self-generation program aimed at capturing cost-effective opportunities for customer-sited load displacement. This initiative is referenced in the Level 2 DSM option provided earlier in Section 3.0 of this Rebuttal Evidence.

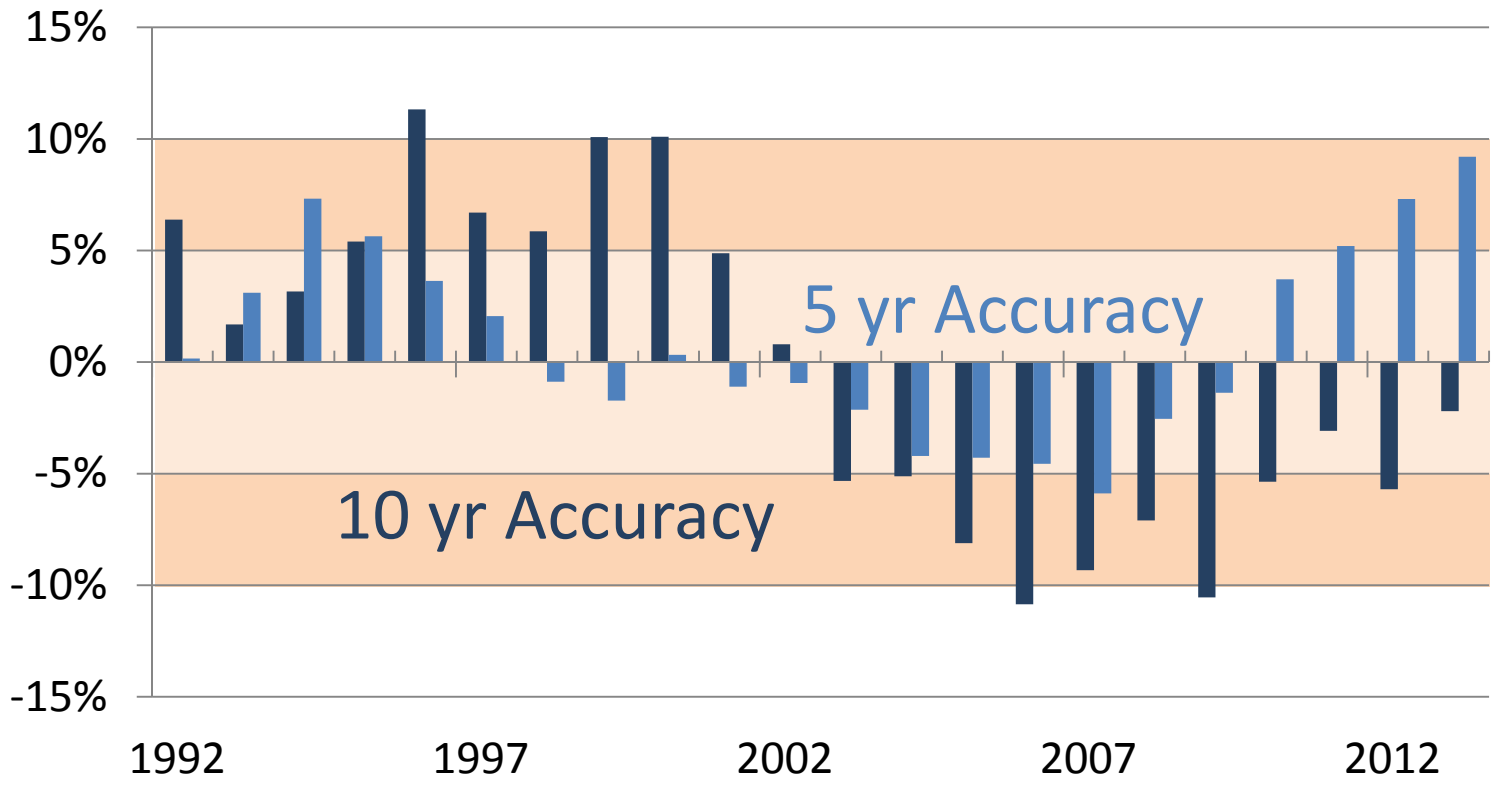
TAB 5

Forecast Accuracy



Manitoba Hydro

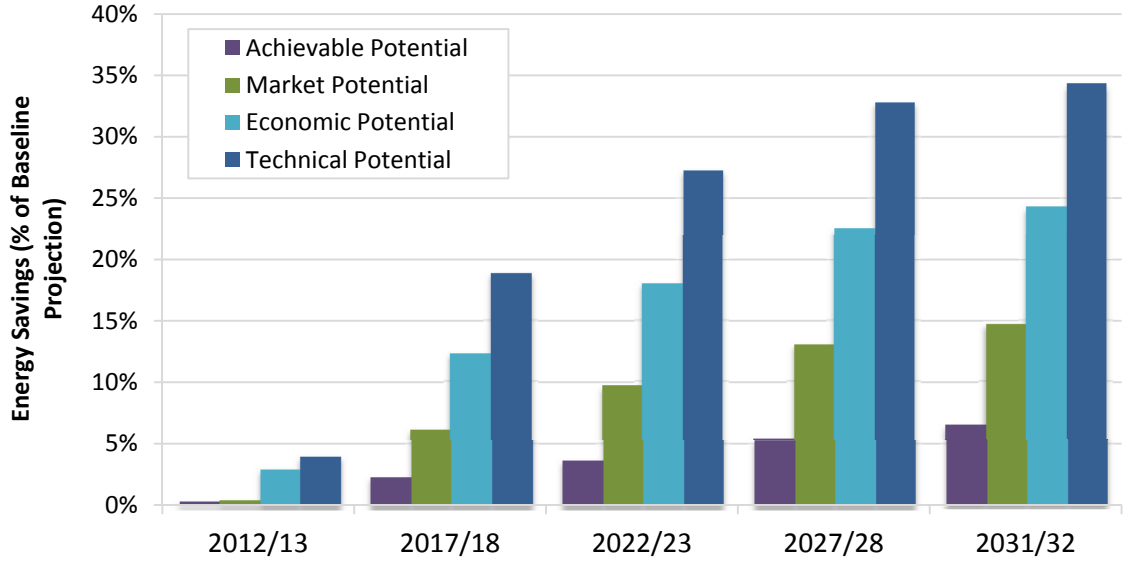
Forecast Accuracy



Manitoba Hydro

Residential potential summary

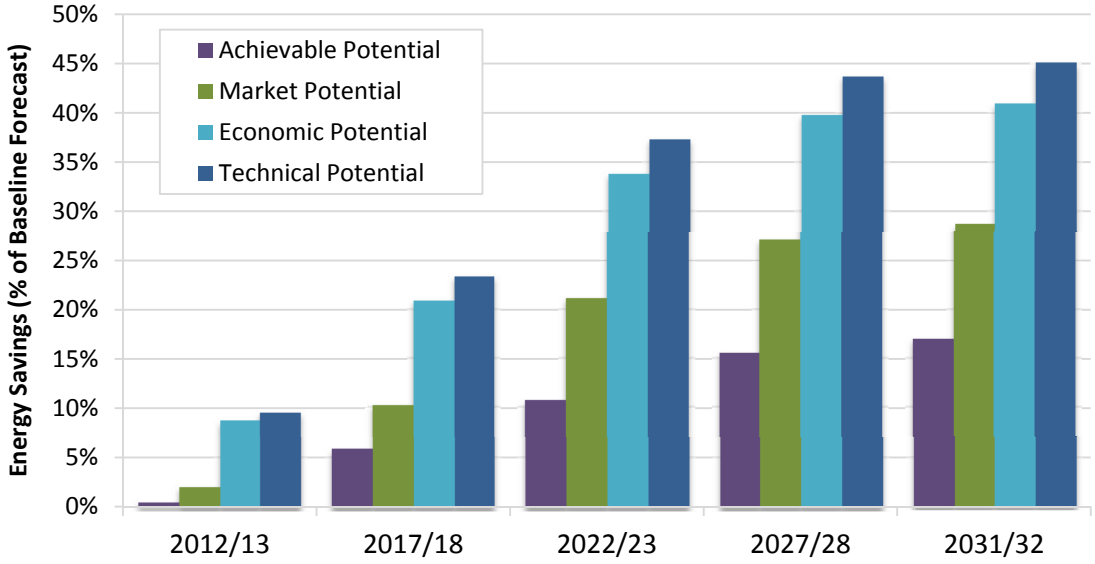
Achievable potential savings are 6.5% of baseline projection



	2012/13	2017/18	2022/23	2027/28	2031/32
Baseline Projection (GWh)	6,955	7,168	7,592	8,215	8,831
Cumulative Savings (GWh)					
Achievable Potential	16	162	277	435	570
Market Potential	24	438	735	1,075	1,299
Economic Potential	200	886	1,373	1,855	2,152
Technical Potential	273	1,356	2,073	2,698	3,035
Energy Savings (% of Baseline)					
Achievable Potential	**0.2%**	**2.3%**	**3.7%**	**5.3%**	**6.5%**
Market Potential	0.3%	6.1%	9.7%	13.1%	14.7%
Economic Potential	2.9%	12.4%	18.1%	22.6%	24.4%
Technical Potential	3.9%	18.9%	27.3%	32.8%	34.4%

Commercial potential summary

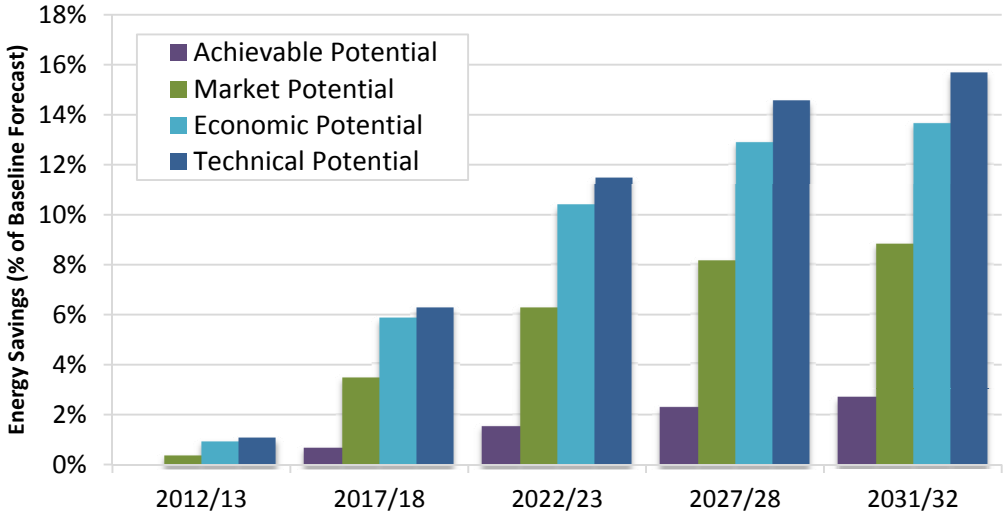
Achievable potential savings are 17.1% of baseline projection



	2012/13	2017/18	2022/23	2027/28	2031/32
Baseline Projection (GWh)	5,688	5,590	5,858	6,236	6,581
Cumulative Savings (GWh)					
Achievable Potential	25	327	629	974	1,123
Market Potential	114	572	1,241	1,696	1,892
Economic Potential	493	1,169	1,986	2,485	2,699
Technical Potential	538	1,311	2,191	2,727	2,976
Energy Savings (% of Baseline)					
Achievable Potential	**0.4%**	**5.8%**	**10.7%**	**15.6%**	**17.1%**
Market Potential	2.0%	10.2%	21.2%	27.2%	28.8%
Economic Potential	8.7%	20.9%	33.9%	39.8%	41.0%
Technical Potential	9.5%	23.5%	37.4%	43.7%	45.2%

Industrial potential summary

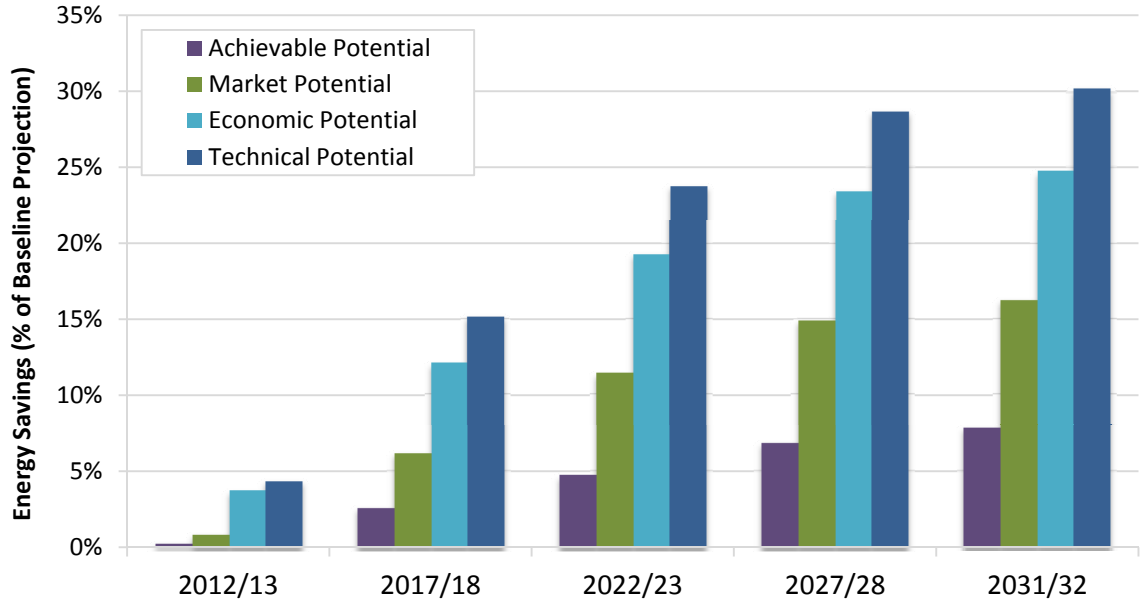
Achievable potential savings are 2.7% of baseline projection



	2012/13	2017/18	2022/23	2027/28	2031/32
Baseline Projection (GWh)	7,978	8,177	8,556	9,016	9,304
Cumulative Savings (GWh)					
Achievable Potential	-	54	132	206	250
Market Potential	28	282	538	736	822
Economic Potential	73	478	890	1,166	1,274
Technical Potential	84	513	981	1,315	1,463
Energy Savings (% of Baseline)					
Achievable Potential	**0.0%**	**0.7%**	**1.5%**	**2.3%**	**2.7%**
Market Potential	0.3%	3.5%	6.3%	8.2%	8.8%
Economic Potential	0.9%	5.8%	10.4%	12.9%	13.7%
Technical Potential	1.1%	6.3%	11.5%	14.6%	15.7%

Summary of electric conservation potential

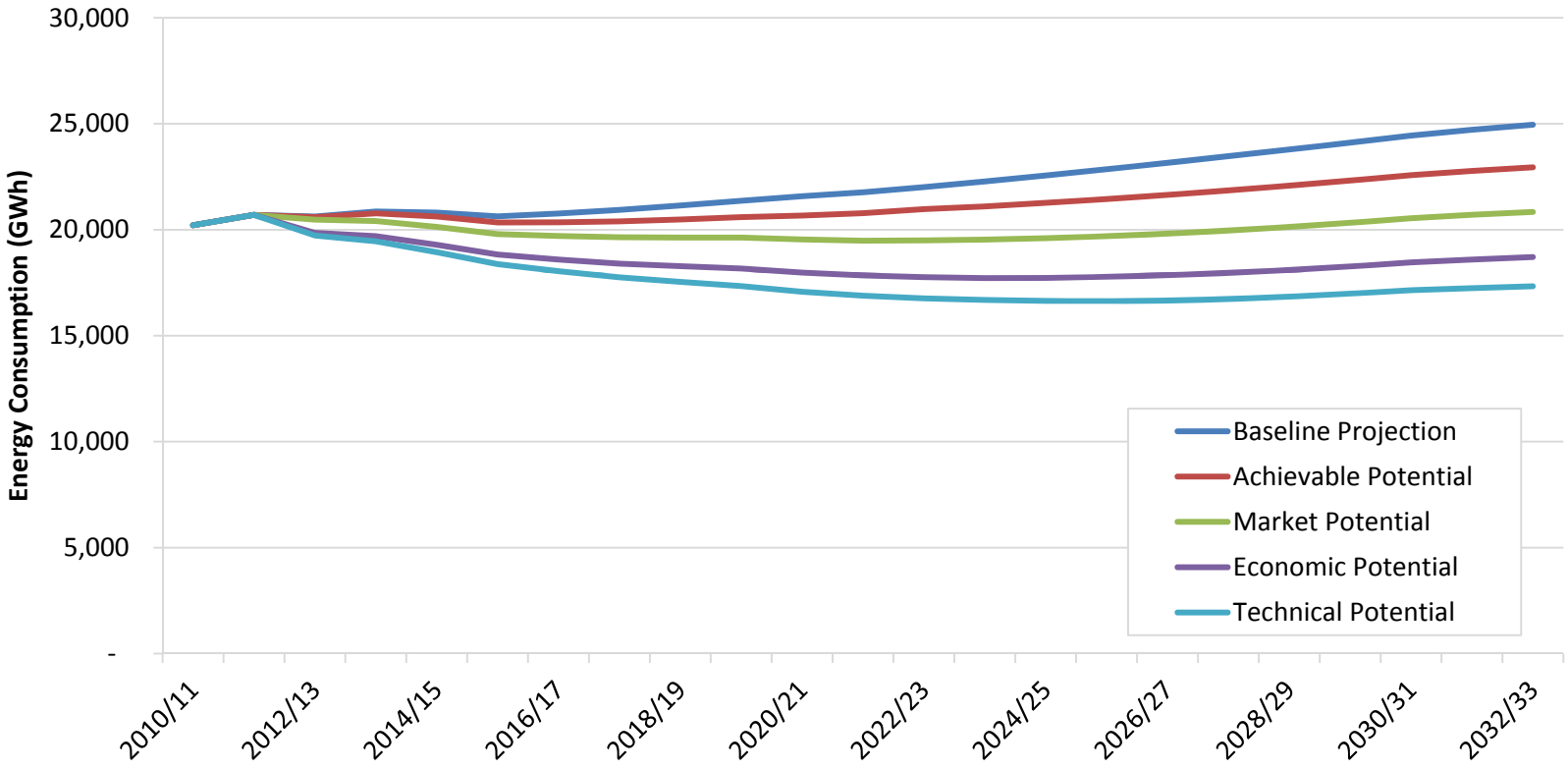
Achievable potential savings are 7.9% of the baseline projection



	2012/13	2017/18	2022/23	2027/28	2031/32
Baseline Projection (GWh)	20,621	20,935	22,007	23,466	24,716
Cumulative Savings (GWh)					
Achievable Potential	48	542	1,038	1,615	1,943
Market Potential	166	1,292	2,513	3,507	4,014
Economic Potential	766	2,533	4,249	5,507	6,125
Technical Potential	895	3,180	5,244	6,740	7,474
Energy Savings (% of Baseline)					
Achievable Potential	**0.2%**	**2.6%**	**4.7%**	**6.9%**	**7.9%**
Market Potential	0.8%	6.2%	11.4%	14.9%	16.2%
Economic Potential	3.7%	12.1%	19.3%	23.5%	24.8%
Technical Potential	4.3%	15.2%	23.8%	28.7%	30.2%

Manitoba Hydro

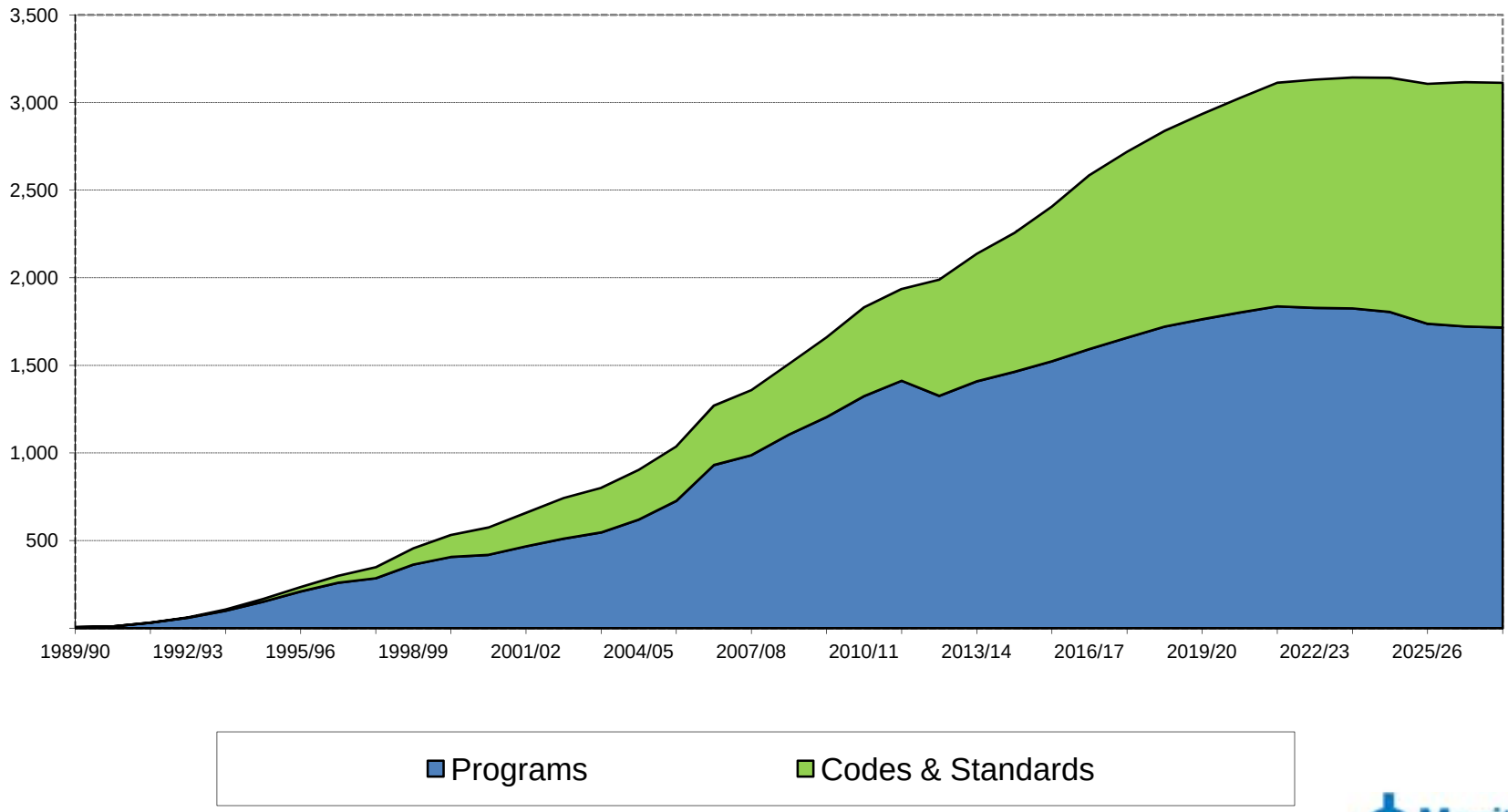
Baseline projection and potential forecasts



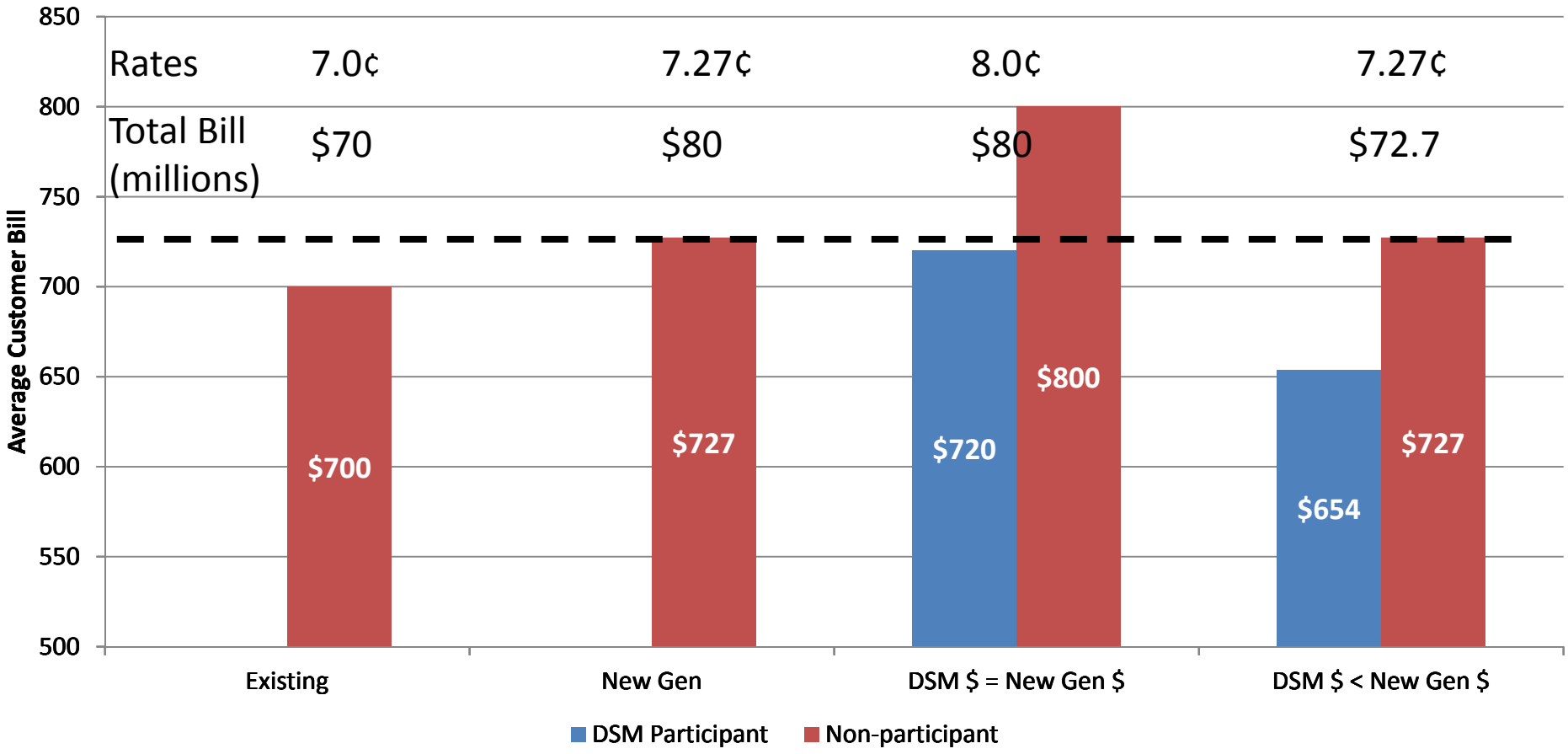
Manitoba Hydro

DSM Saving: Codes vs Programming

GW.h Savings



Average Customer Bill Under Different Resource Scenario's



Manitoba Hydro

REFERENCE: Chapter 4: The Need for New Resources; Section: 4.2.2.2; Chapter 4, 4.2.2.2, Pg. 23- DSM Screening

PREAMBLE: In evaluating Demand-Side Management programs, the Rate Impact Measure test should not be a barrier to higher levels of Demand-Side Management savings and should be applied only at the portfolio level, not the individual program level. Order 43/13 Page 44

QUESTION:

Please more fully describe the framework used to assess DSM opportunities, including economics, barriers and fairness of all ratepayers.

RESPONSE:

The framework used by Manitoba Hydro to assess DSM opportunities is based on the following underlying and key principles:

- All economic DSM opportunities should be pursued; and
- The optimal strategy in pursuing those economic DSM opportunities should consider :
    1) Each DSM opportunity individually to determine the appropriate strategy for implementation;
    2) The benefits and synergies of taking a broader, long term and holistic perspective towards pursuing DSM opportunities;
    3) The overall benefits and costs associated with DSM opportunities, irrespective of who benefits and pays;
    4) The value proposition of pursuing DSM opportunities from a customer, utility and societal perspective;
    5) The fairness of who pays for DSM initiatives given the benefits are not shared equally among all customers.

The economics of a DSM opportunity are assessed as described in Section 4.2.2.2. of Manitoba Hydro's submission, including the metrics used by the Corporation. All metrics provide useful information in the DSM decision making process which considers whether a DSM opportunity should be pursued, and if so, the best strategy for pursuing the DSM opportunity.

Manitoba Hydro uses the Marginal Resource Cost (MRC) to assess the incremental benefits of implementing a DSM measure relative to the incremental costs. If the benefits are greater than the costs (i.e. MRC > 1), then the DSM opportunity should be pursued. The MRC metric provides a simplistic perspective which only compares the incremental cost of implementing a DSM measure to the marginal value associated with implementing the DSM measure. No consideration is given to program administration costs or free ridership (ie. natural conservation whereby some customers would implement the DSM opportunity without any market intervention). Manitoba Hydro will consider all DSM opportunities having a MRC > 1. In addition, Manitoba Hydro generally supports DSM opportunities with MRC < 1 through educational/awareness initiatives and supports emerging technologies, recognizing the costs of these technologies may change over time.

In assessing alternative strategies for pursuing a DSM opportunity, Manitoba Hydro considers the economics from all perspectives, the barriers to participation and the fairness to all ratepayers. Manitoba Hydro designs programs by taking a balanced approach to achieving the objectives outlined above.

In assessing the merits of various approaches to supporting and promoting a DSM opportunity, Manitoba Hydro uses the various metrics discussed in s. 4.2.2.2 of the submission as guidelines in choosing a strategy which is most appropriate for each specific DSM opportunity. The analysis involves:

- Understanding what barriers exist for each DSM opportunity, including product availability, upstream delivery constraints, customer awareness, customer benefits versus costs, customer financial constraints, and customer priorities;
- Assessing alternative utility strategies, including awareness efforts, customer incentives including varying levels, upstream incentives including varying levels, financing tools, program delivery options, duration of programming efforts, and varying programming efforts over time (e.g. potentially ramping up incentives over time to capture deeper energy savings within a targeted market or opportunity);
- Assessing alternative utility strategies against the value proposition associated with DSM opportunities;
- Assessing the fairness of a utility's investment on behalf of non-participating customers; and
- Assessing the reasonableness of a utility's investment on behalf of all ratepayers.

Manitoba Hydro uses the DSM metrics as guidelines rather than rigid requirements due to the varying dynamics associated with each DSM opportunity and with Manitoba Hydro's business environment. Examples of varying dynamics which may influence Manitoba Hydro's DSM decision making include:

- Government incentives such as those offered through the Federal ecoENERGY Retrofit program. Manitoba Hydro temporarily modified its programs to take advantage of the window of opportunity to increase customer participation and capture additional energy savings;
- Market acceptance factors which may accelerate expected adoption rates. In such cases, an optimized strategy to pursue the opportunity may be a deferred, a non-incentive based program or potentially a non cost effective initiative (e.g. even without having an incentive-based program promoting residential LED lighting, Manitoba Hydro has observed the shelf space for LED lighting in Manitoba retail stores is comparable to other regions);

- Timing of incentives. An optimized strategy for pursuing some DSM retrofit opportunities may involve offering lower incentives initially and subsequently offering higher incentives and greater outreach to capture deeper energy savings within the particular DSM opportunity, recognizing that in the latter stages of the overall strategy, the DSM initiative may no longer be cost effective.
- Electricity export market conditions. By way of example, this occurred during the post 2008 timeframe, when Manitoba Hydro's short-term electricity market was less favourable, which impacted the aggressiveness and timing of pursuing certain DSM opportunities. For example, customer self-generation based on short term economic value was no longer economic. Further, for retrofit opportunities, alternative timing options are available for capturing energy savings which may offer a more optimal DSM approach, with the energy savings still captured by a targeted date even with a delayed launch date. The value of capturing targeted energy savings in the mid and longer term is still important.

With respect to assessing the fairness of a utility's investment in DSM on behalf of non-participating customers and assessing the reasonableness of a utility's investment on behalf of all ratepayers, Manitoba Hydro uses the various DSM metrics as guidelines in an overall effort to balance its objective of pursuing all economic opportunities against the objectives of being fiscally responsible and being mindful of the net impact on all customers. For example: although the impact of a particular DSM strategy and overall investment might result in Manitoba Hydro's aggregate customer bills being lower, the impact on specific customer segments may be different with participating customers potentially having lower bills at the expense of non-participating customers having higher bills. This is best illustrated by considering a simple example associated with a generic utility confronted with a decision on to meet additional load, as follows:

Theoretical Example: A Utility has 1000 GWh of existing load, has 1000 GWh of existing generation and has an embedded cost of service equal to 7 cents/kWh. In the current situation:

- the utility's aggregate customers' bills are $70 million
- A typical customer using 10,000 kWh per year has an annual bill of $700.

Next year, the utility's load is expected to increase by 100 GWh. which is associated with additional customers using the same average load as the existing customers (e.g. 10,000 kWh/year). The utility can either meet the new load requirements through adding additional generation or through DSM initiatives. Under the alternative options available to the utility, the impact to customer bills are as follows:

Case A: Utility adds 100 GWh of new generation at a levelized cost of 10 cents/kWh. which increases its embedded cost such that rates need to be increased to 7.27 cents/kWh. (($70 million + ($0.1/kWh x 100 GWh)) / 1,100 GWh). With this option:

- Total aggregate customer bills are $80 million.
- A typical customer using 10,000 kWh per year now has an annual bill of $727 which reflects the higher cost associated with the new generation added to the utility's system.

Case B: Utility invests in DSM and reduces its load by 100 GWh or the equivalent amount expected coming from additional load growth. The investment by the utility in DSM is equivalent to the cost of new generation (10 cents/kWh) and the utility's rates are now increased to 8 cents/kWh ($80 million revenue requirement divided by 1000 GWh of load). This reflects the difference between generation options and DSM options as there is no additional revenue associated with DSM while there is with adding new generation. As a result, rates have to increase by a greater amount under the DSM option when an equivalent dollar amount

is invested in the DSM option. In this case, it is assumed the utility pays the entire cost of the DSM initiatives and participating customers do not contribute. For this example, it is assumed the participating customers in DSM experience a 10% reduction in load which in aggregate achieves the targeted 100 GWh. With this option:

- Total aggregate customer bills are $80 million (i.e. the same as if the utility invested the equivalent amount in additional generation).
- Participating customers in DSM have typical annual bills associated with 9,000 kWh of $720 (subject to rounding, equivalent to Case A where the utility used new generation to meet the additional load requirements).
- Non participating customers have typical annual bills associated with 10,000 kWh of $800 which is higher than what these customers would have experienced under Case A.

Case C: Utility invests in DSM and reduces its load by 100 GWh; however in this case, the utility shares the cost of achieving the DSM energy savings with participating customers, with the utility investing a levelized 0.27 cents/kWh and the participating customers contributing the balance. Under this scenario, the utility needs to raise rates to 7.27 cents/kWh. In this case:

- Total aggregated customer bills are $72.7 million.
- Participating customers in DSM have annual energy bills associated with their reduced load (9,000/kWh) of $654 however these customers also were required to contribute to the investment in DSM.
- Non participating customers now have annual bills of $727, which is the same as if the utility had invested in new generation.

As demonstrated in the theoretical example, Case C attempts to balance the fairness issue by ensuring non participating customers in DSM are as well off under the option where a utility invests in DSM opportunities as opposed to new generation options. The example is provided to illustrate the importance of considering the fairness issue and providing an understanding

how benefits realized by participating customers can be at the expense of non participating customers.

Caution must be exercised in extrapolating the results associated with this theoretical example into Manitoba Hydro's situation. As described in the response to CAC GAC/MH 1-018(b), costs and potential rate impacts for Manitoba Hydro and its customers are more complicated than presented in the theoretical example.

TAB 6

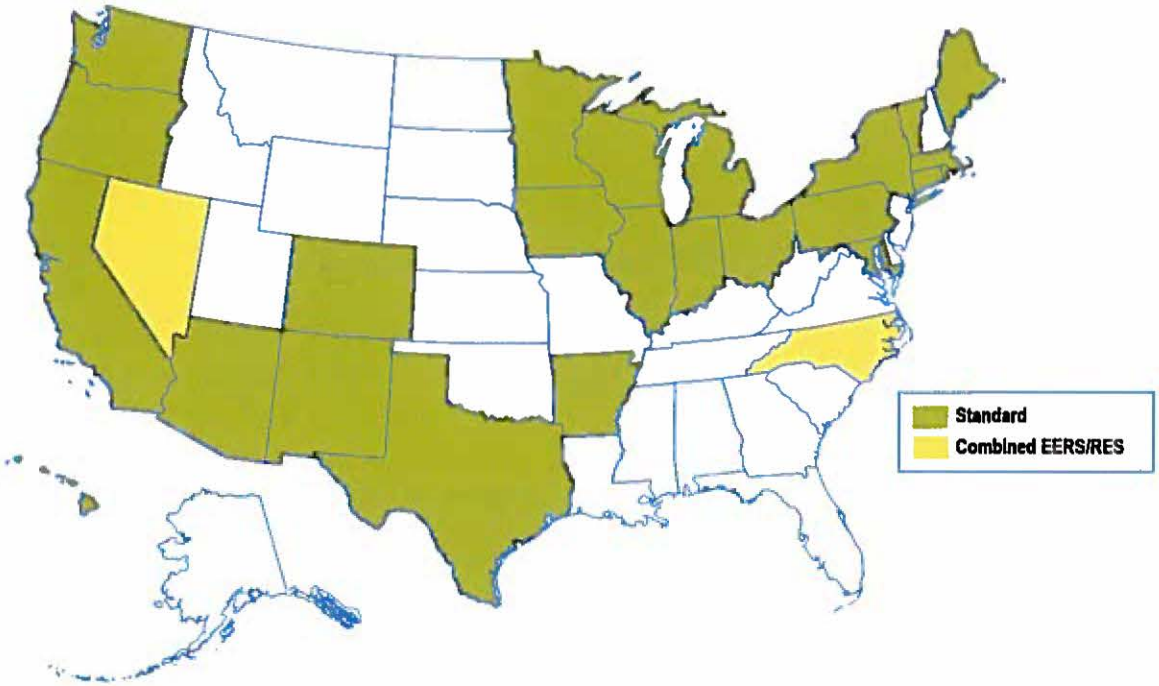
ACEEE Policy Brief

American Council for an Energy-Efficient Economy

State Energy Efficiency Resource Standards (EERS)

February 2014

EERS Policy Approaches by State (As of February 2014)



Twenty-six[1] states have enacted long-term (3+ years), binding energy savings targets, or Energy Efficiency Resource Standards (EERS). These 26 states make up nearly 62% of electricity sales in the United States. If each of these states maintains its current EERS target out to 2020, the overall savings would be more than 240,500 GWh by 2020, equivalent to over 6.3% of 2011 sales nationwide, or the combined electricity consumption of Maryland, Washington, Minnesota, Vermont, and Rhode Island.

This policy brief outlines state EERS approaches. For a more in-depth look at individual state EERS policies, visit ACEEE's State Energy Efficiency Policy Database. The Database also describes other types of utility energy efficiency policies in each of the fifty states plus the District of Columbia. It also highlights specific policies and programs states use to implement efficiency, and the methods by which they evaluate programs and measure and verify savings. The database is updated annually in conjunction with the State Energy Efficiency Scorecard.

[1] Does not include Delaware (EERS pending), Florida (programs funded at levels far below what is necessary to meet targets), Utah, or Virginia (voluntary standards).

529 14th Street NW, Suite 600 Washington, DC 20045 P 202.507.4000 F 202.429.2248 www.aceee.org

EERS Policy Status by State

	-State -Year Enacted -Electric/Natural Gas -Applicability (% sales affected)	Energy Efficiency Resource Standard	Reference
1	**Arizona** 2009 Electric and Nat. Gas IOUs, Co-ops (~59%)	Electric: Annual savings targets began at 1.25% of sales in 2011, ramping up to 2.5% in 2016 through 2020 for cumulative annual electricity savings of 22% of retail sales, of which 2% may come from peak demand reductions. Natural Gas: ~0.6% annual savings (for cumulative savings of 6% by 2020).	Docket No. RE-00000C-09-0427, Decision 71436 Docket No. RE-00000C-09-0427, Decision 71819 Docket No. RG-00000B-09-0428 Dec. No. 71855
2	**Arkansas** 2010 Electric and Nat. Gas IOUs (~53%)	Electric: Annual reduction of 0.75% of total electric kWh sales in 2014 and 0.9% in 2016. Natural Gas: Annual reduction of 0.40% in 2014 and 0.5% in 2015. The Commission has withheld a ruling on targets for 2016-2017 pending a potential study.	Order No. 17, Docket No. 08-144-U; Order No. 15, Docket No. 08-137-U Order No. 1, Docket No. 13-002-U
3	**California** 2004 and 2009 Electric and Nat. Gas IOUs (~78%)	Electric: ~0.85% annual savings through 2020. Demand reduction of 4,541 MW through 2020. Natural Gas: 619 gross MMTh between 2012 and 2020. Utilities must pursue all cost-effective efficiency resources.	CPUC Decision 04-09-060; CPUC Decision 08-07-047; CPUC Decision 09-09-047
4	**Colorado** 2007 Electric and Nat. Gas IOUs (~57%)	Electric: Black Hills follows PSCo savings targets of 0.8% of sales in 2011, increasing to 1.35% of sales in 2015 and 1.66% of sales in 2019. Natural Gas: Savings targets commensurate with spending targets (at least 0.5% of prior year's revenue).	Colorado Revised Statutes 40-3.2-101, et seq. ; Docket No. 08A-518E Dec. R09-0542 COPUC Docket No. 12A-100E Dec. R12-0900; Docket 10A-554EG

	-State -Year Enacted -Electric/Natural Gas -Applicability (% sales affected)	Energy Efficiency Resource Standard	Reference
5	**Connecticut** 2007 & 2013 Electric and Nat. Gas IOUs (~94%)	Electric: Targets equivalent to annual savings of ~1.4% through 2015. Natural Gas: Average annual savings of ~60 MMTherms through 2015 Utilities must pursue all cost-effective efficiency resources.	Public Act No. 07-242 Public Act No. 13-298 2013-2015 Electric and Natural Gas Conservation and Load Management Plan
6	**Hawaii** 2004 and 2009 Electric Statewide Goal (100%)	In 2009, transitioned away from a combined RPS-EERS to a standalone EEPS goal to reduce electricity consumption by 4,300 GWh by 2030 (equal to ~30% of forecast electricity sales, or 1.4% annual savings).	HRS §269-91, 92, 96 HI PUC Order, Docket 2010-0037
7	**Illinois** 2007 Electric and Nat. Gas Utilities with over 100,000 customers, Illinois DCEO (~89%)	Electric: 0.2% annual savings in 2008, ramping up to 1% in 2012, 2% in 2015 and thereafter. Annual peak demand reduction of 0.1% through 2018. Natural Gas: 8.5% cumulative savings by 2020 (0.2% annual savings in 2011, ramping up to 1.5% in 2019). Energy efficiency measures may not exceed an established cost-cap.	S.B. 1918 Public Act 96-0033 § 220 ILCS 5/8-103
8	**Indiana** 2009 Electric Jurisdictional utilities (IOUs and Muni's) (~75%)	0.3% annual savings in 2010, increasing to 1.1% in 2014, and leveling at 2% in 2019.	Cause No. 42693, Phase II Order
9	**Iowa** 2009 Electric and Nat. Gas IOUs (~75%)	Electric: Varies by utility from 1-1.5% annually through 2014. Natural Gas: Varies by utility from 0.74-1.2% annually through 2014.	Senate Bill 2386 Iowa Code § 476
10	**Maine** 2009 Electric and Nat. Gas Efficiency Maine (100%)	Electric and natural gas savings of 20% by 2020, with annual savings targets of ~1.6% for electric and ~0.3% for natural gas. Efficiency Maine operates under an all cost-effective mandate.	Efficiency Maine Triennial Plan H.P. 1128 – L.D. 1559

	-State -Year Enacted -Electric/Natural Gas -Applicability (% sales affected)	Energy Efficiency Resource Standard	Reference
11	**Maryland**[2] 2008 Electric Statewide Goal (100%)	15% per-capita electricity use reduction goal by 2015 (10% by utilities, 5% achieved independently). 15% reduction in per capita peak demand by 2015, compared to 2007. The next round of targets are currently under discussion.	Md. Public Utility Companies Code § 7-211
12	**Massachusetts** 2009 Electric and Nat. Gas IOUs, Co-ops, Muni's, Cape Light Compact (~80%)	Electric: 1.4% in 2010, 2.0% in 2011; 2.4% in 2012; 2.5% in 2013 increasing to 2.6% by 2015. Natural Gas: 0.63% in 2010, 0.83% in 2011; 1.15% in 2012; 1.08% in 2013 increasing to 1.19% by 2015. Utilities operate under an all cost-effective efficiency requirement.	D.P.U. Order 09-116 through 09-128 D.P.U. Order 12-100 through 12-111
13	**Michigan** 2008 Electric and Nat. Gas Statewide Goal (100%)	Electric: 0.3% annual savings in 2009, ramping up to 1% in 2012 and continuing through 2015. Natural Gas: 0.10% annual savings in 2009, ramping up to 0.75% in 2012 and continuing through 2015.	M.G.L. ch. 25, § 21; Act 295 of 2008
14	**Minnesota** 2007 Electric and Nat. Gas Statewide Goal (100%)	Electric: 1.5% annual savings in 2010 and thereafter. Natural Gas: 0.75% annual savings from 2010-2012; 1% annual savings in 2013 and thereafter.	Minn. Stat. § 216B.241
15	**Nevada** 2005 and 2009 Electric IOUs (~62%)	20% of retail electricity sales to be met by renewables and energy efficiency by 2015, and 25% by 2025. Energy efficiency may meet a quarter of the standard through 2014, but is phased out of the RPS by 2025.	NRS 704.7801 et seq.
16	**New Mexico** 2008 and 2013 Electric IOUs (68%)	5% reduction from 2005 total retail electricity sales by 2014, and an 8% reduction by 2020.	N.M. Stat. § 62-17-1 et seq.

[2] The 15% per-capita electricity use reduction goal translates to around 17% cumulative savings over 2007 retail sales.

	-State -Year Enacted -Electric/Natural Gas -Applicability (% sales affected)	Energy Efficiency Resource Standard	Reference
17	**New York** 2008 Electric and Nat. Gas Statewide Goal (100%)	Electric: 15% cumulative savings by 2015. Natural Gas: ~14.7% cumulative savings by 2020.	NY PSC Order, Case 07-M-0548 NY PSC Order, Case 07-M-0748
18	**North Carolina** 2007 Electric Statewide Goal (100%)	Renewable Energy and Energy Efficiency Portfolio Standard (REPS) requires renewable generation and/or energy savings of 6% by 2015, 10% by 2018, and 12.5% by 2021 and thereafter. Energy efficiency is capped at 25% of target, increasing to 40% in 2021 and thereafter.	N.C. Gen. Stat. § 62-133.8 04 NCAC 11 R08-64, et seq.
19	**Ohio** 2008 Electric IOUs (~89%)	22% by 2025 (0.3% annual savings in 2009, ramping up to 1% in 2014 and 2% in 2019). Peak demand reduction targets of 1% in 2009 and an additional 0.75% each year thereafter until 2018.	ORC 4928.66 et seq. S.B. 221
20	**Oregon** 2010 Electric and Nat. Gas Energy Trust of Oregon (~70%)	Electric: Targets are equivalent to 0.8% of 2009 electric sales in 2010, ramping up to 1% in 2013 and 2014. Natural Gas: 0.2% of sales in 2010 ramping up to 0.4% in 2014.	Energy Trust of Oregon 2009 Strategic Plan
21	**Pennsylvania** 2004 and 2008 Electric Utilities with over 100,000 customers (~93%)	3% cumulative savings from 2009 to 2013; ~2.3% cumulative savings from 2014-2016. Cumulative peak demand reduction of 4.5% by 2013 compared to 2007. EERS includes peak demand targets. Energy efficiency measures may not exceed an established cost-cap.	66 Pa C.S. § 2806.1; PUC Order Docket No. M-2008-2069887; PUC Implementation Order Docket M-2012-2289411
22	**Rhode Island** 2006 Electric and Nat. Gas IOUs, Muni's (~99%)	Electric: Annual savings of 1.7% in 2012, 2.1% in 2013, 2.5% in 2014. EERS includes demand response targets. Natural Gas: Annual savings of 0.6% in 2012, 0.8% in 2013, and 1.0% in 2014. Utilities must acquire all cost-effective energy efficiency.	R.I.G.L § 39-1-27.7 Docket 4284, 4295
23	**Texas** 1999 and 2007 Electric	20% Incremental Load Growth in 2011 (equivalent to ~0.10% annual savings); 25% in 2012, 30% in 2013 onward. Peak demand	Senate Bill 7;

	-State -Year Enacted -Electric/Natural Gas -Applicability (% sales affected)	Energy Efficiency Resource Standard	Reference
	IOUs (~73%)	reduction targets of 0.4% compared to previous year. Energy efficiency measures may not exceed an established cost cap.	House Bill 3693; Substantive Rule § 25.181 Senate Bill 1125
24	**Vermont** 2000 Electric Efficiency Vermont (100%)	Expected cumulative savings of ~6.6% from 2012 to 2014. EERS includes demand response targets. Efficiency Vermont operates under an all cost-effective energy efficiency.	30 V.S.A. § 209; VT PSB Docket EEU-2010-06
25	**Washington** 2006 Electric IOUs, Co-ops, Muni's (~81%)	Biennial and Ten-Year Goals vary by utility. Law requires savings targets to be based on the Northwest Power Plan, which estimates potential annual savings of about 1.5% through 2030 for Washington utilities. Utilities operate under an all cost-effective conservation requirement.	Ballot Initiative I-937 WAC 480-109 WAC 194-37
26	**Wisconsin** 2011 Electric and Nat. Gas Focus on Energy (100%)	Electric: Annual savings of ~0.66% of sales in 2011-2014. Natural Gas: Annual savings of ~0.5% of sales in 2011-2014. Energy efficiency measures may not exceed an established cost-cap.	Order, Docket 5-GF-191

For further information on Energy Efficiency Resource Standards, please visit http://www.aceee.org/topics/eers

ACEEE Contacts:

Annie Downs
adowns@aceee.org
(202) 507-4002

Maggie Molina
mmolina@aceee.org
(202) 507-4004