CAC/MH I-1

Reference: Application, page 2 (lines 29-36)

2012/13 & 2013/14 GRA, PUB/MH I-2 a)

Please update the response to PUB/MH I-2 a).

ANSWER:

Please see Manitoba Hydro's response to PUB/MH I-2.

CAC/MH I-2

Reference: Application, Section 1.0 – Summary of the Application

2012/13 & 2013/14 GRA, PUB/MH I-53

Please update the response to PUB/MH I-53 to reflect results to date and the current Application.

ANSWER:

Please see Manitoba Hydro's response to PUB/MH I-3.

CAC/MH I-3

Reference: Application, pages 4 (lines 7-12) and12 (lines 7-10)

2012/13 & 2013/14 GRA, PUB/MH I-9 e)

Please provide a schedule similar to that in PUB/MH I-9 e) based on MH13 that also includes the actual values for 2012/13.

ANSWER:

Please see the attached schedule.

	Actual					Forecast - IFF13															
	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
OM&A expense 'electric only' (in millions of $)	364	378	397	403	463	485	494	542	548	567	574	586	612	620	633	646	660	673	705	720	735
# of Customers	527,472	532,359	537,299	542,681	548,774	554,957	561,140	567,344	573,555	579,793	586,043	592,306	598,571	604,824	611,044	617,216	623,323	629,362	635,328	641,214	647,009
OM&A per customer (in dollars) net of Accounting Changes	691	709	739	743	844	873	881	955	955	977	979	989	1,022	1,025	1,037	1,047	1,058	1,070	1,109	1,123	1,136

	Actual					Forecast - IFF13															
	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
OM&A expense 'electric only' (in millions of $)	364	378	397	403	463	485	494	542	548	567	574	586	612	620	633	646	660	673	705	720	735
CGAAP Changes																					
Intangibles																					
DSM	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2
Planning Studies	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3
IT Application	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total	5	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	6
Overhead Capitalized																					
Stores	5	5	5	5	5	6	6	6	6	6	6	6	6	6	6	6	6	7	7	7	7
Admin& General	-	4	24	24	52	53	54	54	55	55	56	56	57	58	59	60	62	63	64	65	67
Store & Admin General	5	9	29	29	57	58	59	60	60	61	62	62	63	64	65	67	68	69	71	72	74
Change in Discount Rate on Pension & Other Benefits	-	-	-	3	12	24	27	27	28	28	28	28	29	29	30	30	31	32	32	33	34
Subtotal CGAAP Changes	10	13	33	37	73	86	91	91	92	93	94	95	96	98	100	102	104	106	109	111	113
IFRS Changes																					
DSM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Site Remediation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Regulatory Costs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pension	-	-	-	-	-	-	-	1	3	5	8	10	13	15	17	19	21	23	25	27	29
Employee Benefits (amortization of RHSA)	-	-	-	-	-	-	-	(6)	(2)	(1)	(1)	(1)	(1)	(0)	(0)	(0)	(0)	-	-	-	-
Admin & General	-	-	-	-	-	-	-	52	52	53	53	54	54	55	57	58	59	60	61	62	64
Subtotal IFRS Changes	-	-	-	-	-	-	-	47	53	57	60	63	66	70	73	77	80	83	86	90	93
Reclassifications																					
Wire & Telecom Services	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4
Funding Agreements	-	(5)	(5)	(5)	(5)	(5)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(7)	(7)	(7)
Operating Expense Recoveries					8	8	9	9	9	9	9	9	9	9	10	10	10	10	10	11	11
Subtotal Reclassifications	3	(2)	(2)	(2)	6	6	6	7	7	7	7	7	7	7	7	7	7	8	8	8	8
Total OM&A Accounting Changes	13	11	31	35	80	92	97	145	152	157	161	166	169	175	181	186	192	197	203	208	214
OM&A expense 'electric only' net of Accounting Changes	351	367	366	369	383	392	397	397	395	410	412	420	442	445	453	460	468	476	502	512	521
# of Customers	527,472	532,359	537,299	542,681	548,774	554,957	561,140	567,344	573,555	579,793	586,043	592,306	598,571	604,824	611,044	617,216	623,323	629,362	635,328	641,214	647,009
OM&A per customer (in dollars) net of Accounting Changes	666	689	682	679	699	707	708	700	689	707	704	709	739	735	741	745	751	756	791	798	806

CAC/MH I-4

Reference: Application, page 5 (lines 1-8) and page 15 (lines 1-13)

a) Please provide a schedule that sets out

• The total export volumes, sales (Cdn dollars) and average revenues for the years 2007/08 through 2012/13.

• The US export volumes, sales (US dollars) and average revenues (US dollars) for the years 2007/08 through 2012/13.

• The Canadian export volumes, sales and average revenues for the years 2007/08 through 20112/13.

ANSWER:

Please see the table below.

	TOTAL SALES		TOTAL U.S. SALES			TOTAL CDN SALES	
	GWh	CAD $M	GWh	CAD $M	U.S. $M	GWh	CAD $M
2007/08	11,020	536	10,539	498	483	481	39
2008/09	10,126	520	9,709	470	428	417	50
2009/10	10,860	370	10,487	346	319	373	24
2010/11	10,344	353	9,439	318	310	905	35
2011/12	10,244	327	9,358	292	297	886	34
2012/13	9,087	323	8,326	290	290	761	33

NOTE: Above numbers do not include Merchant transactions.

CAC/MH I-4

Reference: Application, page 5 (lines 1-8) and page 15 (lines 1-13)

b) Please provide a schedule that sets out (based on IFF12):

• The total export volumes, sales (Cdn dollars) and average revenues for the years 2012/13 through 2017/18.

• The US export volumes, sales (US dollars) and average revenues (US dollars) for the years 2012/13 through 2017/18.

• The Canadian export volumes, sales and average revenues for the years 2012/13 through 2017/18.

ANSWER:

Please see Manitoba Hydro's response to CAC/MH I-7.

CAC/MH I-4

Reference: Application, page 5 (lines 1-8) and page 15 (lines 1-13)

c) Please provide a schedule that sets out (based on IFF13):

• The total export volumes, sales (Cdn dollars) and average revenues for the years 2013/14 through 2017/18.

• The US export volumes, sales (US dollars) and average revenues (US dollars) for the years 2013/14 through 2017/18.

• The Canadian export volumes, sales and average revenues for the years 2013/14 through 2017/18.

ANSWER:

Please see Manitoba Hydro's response to CAC/MH I-7.

CAC/MH I-4

Reference: Application, page 5 (lines 1-8) and page 15 (lines 1-13)

d) Please comment/explain the change in average unit export revenues as between IFF12 and IFF13 for the period 2012/13 to 2017/18.

ANSWER:

2012/13 comparison:

Comparison for 2012/13 is not possible as IFF13 does not include this fiscal year.

2013/14 comparison:

Canadian unit export revenues increased significantly from IFF12 to IFF13 primarily due to higher spot market energy prices and the inclusion of a high value short-term contract. Overall average unit export revenues did not significantly change since the proportion of Canadian exports is significantly less than U.S. exports.

2014/15 comparison:

The U.S. average unit export revenues are lower in MH13 than MH12 primarily due to a reduction in energy rates for short-term contracts and in on-peak spot market energy prices. This reduction was partially offset by an increase in off-peak spot market energy prices. The Canadian average unit export revenues fell from IFF12 to IFF13 primarily due to a decrease in on-peak spot market energy prices which was partially offset by an increase in off-peak spot market energy prices.

Comparison for Fiscal Years 2015/16 to 2017/18, inclusive:

Generally the IFF13 average unit export revenues for fiscal years 2015/16 to 2017/18 inclusive, are lower than the respective IFF12 values (refer to CAC/MH I-7a). Changes in average unit revenues are the result of generally lower forecast electricity export prices in IFF13. A decrease in the Manitoba forecast domestic load growth in IFF13 resulted in additional surplus dependable energy available for export.

CAC/MH I-5

Reference: Application, page 5

IFF13, pages 26-28

a) Please provide a schedule with the actual annual electric operations capital spending for the years 2010/11 through 2012/13 broken down into the major spending categories used in IFF13.

ANSWER:

The following schedule depicts the capital spending for the years 2010/11, 2011/12 and 2012/13 broken down into the major spending categories as displayed in CEF13:

MANITOBA HYDRO
ELECTRIC OPERATIONS CAPITAL
(000's)

	2010/11 ACTUAL	2011/12 ACTUAL	2012/13 ACTUAL
ELECTRIC OPERATIONS			
MAJOR NEW GENERATION & TRANSMISSION			
Wuskwatim - Generation	$ 294 967	$ 173 807	$ 71 720
Wuskwatim - Transmission	31 389	43 718	8 022
Herblet Lake - The Pas 230 kV Transmission	21 090	8 251	166
Keeyask - Generation	55 713	79 780	136 562
Keeyask - Transmission	721	449	1 215
Conawapa - Generation	29 724	28 203	30 733
Kelsey Re-runnering	35 263	32 255	27 746
Kelsey Transmission Upgrades	2 533	539	66
Kettle Improvements & Upgrades	17 814	22 137	3 289
Pointe du Bois Spillway Replacement	15 253	24 880	90 456
Pointe du Bois - Transmission	17 004	15 743	10 005
Gillam Redevelopment & Expansion Program (GREP) Phases 1B, 2 & 3	-	-	-
Bipole III - Transmission Line	19 002	18 350	25 091
Community Development Initiative	-	-	-
Bipole III - Converter Stations	28 069	36 417	79 718
Bipole III - Collector Lines	387	2 075	4 394
Riel 230/500 kV Station	46 465	52 732	84 136
Brandon Combustion Turbine Pipeline Upgrade	20	-	-
Firm Import Upgrades	161	22	13
Firm Export Upgrades	158	68	283
St. Joseph Wind Transmission	7 887	1 037	67
Demand Side Management	28 397	27 317	26 589
Waterways Management Program	5 452	-	-
Target Adjustment (Cost Flow)	-	-	-
MAJOR NEW GENERATION & TRANSMISSION TOTAL	**$ 657 469**	**$ 567 780**	**$ 600 271**

MANITOBA HYDRO
ELECTRIC OPERATIONS CAPITAL
(000's)

	2010/11 ACTUAL	2011/12 ACTUAL	2012/13 ACTUAL
MAJOR CAPITAL			
GENERATION OPERATIONS			
Dorsey Synchronous Condenser Refurbishment	$ 4 189	$ 1 904	$ 5 172
Dorsey 230 kV Relay Building Upgrade	7 631	2 488	98
Pine Falls GS Units 1-4 Major Overhauls	3 269	3 972	5 103
Slave Falls Rehabilitation	18 830	9 092	707
Great Falls Unit 4 Overhaul	3 907	6 103	4 762
Water Licenses & Renewals	5 098	5 195	6 792
Pointe Du Bois GS Rehabilitation	114	308	3 599
GENERATION OPERATIONS MAJOR CAPITAL TOTAL	**$ 43 038**	**$ 29 062**	**$ 26 233**
TRANSMISSION			
Rockwood New 230 - 115 kV Station	$ -	$ 624	$ 1 816
Lake Winnipeg East System Improvement	-	365	1 771
Letellier - St. Vital 230 kV Transmission	-	-	105
TRANSMISSION MAJOR CAPITAL TOTAL	**$ -**	**$ 989**	**$ 3 692**
CUSTOMER SERVICE & DISTRIBUTION			
Burrows New 66-12 kV Station	$ 3 960	$ 11 365	$ 19 784
St James New Station & 24 kV Conversion	61	3 343	939
New St. Vital Station	-	-	1
Dawson Road -115/24kv Station	-	-	2
CUSTOMER SERVICE & DISTRIBUTION MAJOR CAPITAL TOTAL	**$ 4 021**	**$ 14 708**	**$ 20 726**
MAJOR CAPITAL TOTAL	**$ 47 059**	**$ 44 759**	**$ 50 651**
BASE CAPITAL			
ELECTRIC			
Generation Operations	$ 136 868	$ 134 226	$ 102 748
Transmission	64 712	74 472	75 301
Customer Service & Distribution	137 191	157 751	154 530
Customer Care & Energy Conservation	3 074	2 961	2 689
Human Resources & Corporate Services	53 742	51 053	46 471
Finance & Regulatory	-	-	300
BASE CAPITAL ELECTRIC TOTAL	**$ 395 587**	**$ 420 463**	**$ 382 039**
TOTAL ELECTRIC OPERATIONS CAPITAL	**$ 1 100 115**	**$ 1 033 002**	**$ 1 032 961**

CAC/MH I-5

Reference: Application, page 5

IFF13, pages 26-28

b) With respect to the response to part (a), please comment on the reasons for any year over year changes of more than 10% for the following categories:

- **Generation Operations**
- **Transmission**
- **Customer Service & Distribution**

ANSWER:

Please see the following schedule for year over year changes of more than 10% for Base Capital for the requested Business Units.

MANITOBA HYDRO
ELECTRIC OPERATIONS CAPITAL
(000's)

	2012/13 ACTUAL	2011/12 ACTUAL	$ Change	% Change
Generation Operations	$102 748	$134 226	(31 478)	(23)
Transmission	75 301	74 472	829	1
Customer Service & Distribution	154 530	157 751	(3 221)	(2)

Generation Operations - (2013 versus 2012)

Projects Added:

- HVDC Transformer Bushing Draw Rod
- HVDC BP1 CQ Disconnect Replacement
- Slave Falls GS Creek Spillway Rehabilitation
- Limestone GS Stilling Basin Rehabilitation
- Limestone GSCADA Replacement

Projects Completed:

- HVDC Converter Transformer Bushing Replacement
- HVDC AC Filter PCB Capacitor Replacement
- BP1 & 2 DC Conv Transformer Bushing Replacement
- Oil Containment Projects - Power Supply

MANITOBA HYDRO
ELECTRIC OPERATIONS CAPITAL
(000's)

	2011/12 ACTUAL	2010/11 ACTUAL	$ Change	% Change
Generation Operations	$134 226	$136 868	(2 642)	(1)
Transmission	74 472	64 712	9 760	15
Customer Service & Distribution	157 751	137 191	20 560	15

Transmission - (2012 versus 2011)

Projects Added:

- D602F 500kV T/L Footing Replacement
- Enbridge Pipelines: Clipper Project Load Addition Phase II
- Ashern Station Bank Addition

Projects Completed:

- Rosser Station 230 - 115 kV Bank 3 Replacement
- Dorsey 500 kV R502 Breaker Replacement
- Interlake Digital Microwave Replacement
- Communication System - Southern MB (Great Plains)
- Communications Upgrade Winnipeg Area
- Pilot Wire Replacement
- Red River Floodway Expansion

Customer Service & Distribution - (2012 versus 2011)

Projects Added:

- Southdale DK732 Cable Replacement
- Royal Canadian Mint Expansion
- IKEA/Seasons of Tuxedo DSC Installation
- Melrose DSC
- Starbuck DSC
- Waskada New 66-25kV Distribution Supply
- Brandon Highland Park Station Capacity Increase
- TCPL Keystone Project
- Line 98 Rebuild Melita to Waskada
- Steinbach Area 66 kV Capacity Upgrade
- Enbridge Pipelines: Clipper Project Load Addition Phase 1
- Waverley West 66kV Supply Upgrade
- Winpak 5 Year - 7MVA Expansion
- Bissett L48-DSC & Cap Bank Installation

Projects Completed:

- Wpg Central District Underground Network Asbestos Removal
- Frobisher Station Upgrade
- Steinbach Area 66 kV Capacity Upgrade
- Enbridge Pipelines: Clipper Project Load Addition Phase 1
- Niverville Station 66-12 kV Bank Replacements

CAC/MH I-5

Reference: Application, page 5

IFF13, pages 26-28

c) Please provide a schedule that contrasts the annual capital spending set out in IFF12 with that of IFF13 by major spending category for the period 2013/14 through 2017/18.

ANSWER:

Please see Manitoba Hydro's response to PUB/MH I-13(b).

CAC/MH I-5

Reference: Application, page 5

IFF13, pages 26-28

d) With respect to the response to part (c), please comment on the reasons for any year over year changes of more than 10% for the following categories:

- **Generation Operations**
- **Transmission**
- **Customer Service & Distribution**

ANSWER:

Please see the following table for the year over year changes for CEF13.

Electric Base Capital (In Millions of Dollars)	2014 Forecast	2015 Forecast	$ Change	% Change
Generation Operations	98	94	(4)	-4%
Transmission	104	115	11	10%
Customer Service & Distribution	175	208	32	18%

Transmission - (2015 versus 2014)

Projects Added:

- Mobile Radio System Modernization

Customer Service & Distribution - (2015 versus 2014)

Projects Added:

- Steinbach North and South Distribution Supply Centre's
- Tyndall DSC
- HSC Service Consolidation & Dist Upgrade
- Thompson Mystery Lake Station Switchgear Repl & Bank Add
- Customer Service & Distribution Domestic
- Martin Station-New 66-4/12kV Station
- William New 66-12kV Station
- Waverley West 66 kV Supply Upgrade
- Waverley West Supply

Projects Completed:

- TCPL Keystone Project
- McTavish DSC and 25kV Voltage Conversion
- Steinbach Area 66kV Capacity Upgrade
- Selkirk DSC
- Lockport DSC

Electric Base Capital (In Millions of Dollars)	2015 Forecast	2016 Forecast	$ Change	% Change
Generation Operations	94	88	(7)	-7%
Transmission	115	126	11	10%
Customer Service & Distribution	208	212	4	2%

No change more than 10%

Electric Base Capital (In Millions of Dollars)	2016 Forecast	2017 Forecast	$ Change	% Change
Generation Operations	88	102	14	16%
Transmission	126	112	(14)	-11%
Customer Service & Distribution	212	229	17	8%

Generation Operations - (2017 versus 2016)

Projects Added:

- Slave Falls Spillway Rehabilitation
- Great Falls Transformer Spares
- Public Water Safety/Security

Projects Completed:

- Generation Operations Remote Control & Monitoring
- Grand Rapids Transformer Refurbish/Spare
- Generation South - PCB Regulation Compliance
- Limestone Governor Control Repl
- Gen S - Security Installations/Upgrades
- Generation Operations NERC Cyber Security Upgrade

Transmission - (2017 versus 2016)

Projects Added:

- Winnipeg - Brandon Transmission System Improvements
- Stanley Station 230-66kV Transformer Add
- Laverendrye-St. Vital new 230 kV Transmission Line & Breakers Replacement
- Fire Protection Projects - HVDC
- HVDC Transformer Replacement Program
- HVDC Smoothing Reactor Replacements
- HVDC Bipole 1 DCCT Transductor Replacement
- HVDC Bipole 1 & 2 DC Converter Transformer Bushing Replacements

More than offset by Target Adjustment

Electric Base Capital (In Millions of Dollars)	2017 Forecast	2018 Forecast	$ Change	% Change
Generation Operations	102	64	(38)	-37%
Transmission	112	70	(42)	-37%
Customer Service & Distribution	229	144	(85)	-37%

All Business Units (2018 versus 2017)

Beginning in 2017/18, Base Capital targets are set at $500 million per year and escalated at 1% per year thereafter.

CAC/MH I-6

Reference: Application, pages 5 (lines19-29)
2012/13 & 2013/14 GRA, PUB/MH I-82 b)

Please provide an update on Manitoba Hydro's development of asset condition assessments for each of its Business Units.

ANSWER:

Manitoba Hydro's Generation, Transmission and Distribution business units have been developing a consolidated asset condition report for the Corporation's major assets. The following are updates for each business unit:

- Generation Operations completed its initial asset condition assessments on the drive train components for all generating units, and is currently preparing a report based on these results.
- Transmission has completed an initial condition assessment of its circuit breaker, transformer and transmission line wood pole structure assets. Transmission has begun condition assessments of additional asset classes in preparation for the consolidated asset condition assessment report.
- Manitoba Hydro submitted its initial "Distribution Asset Condition" report to the PUB in 2012 and is in the process of updating the document for 2014.

CAC/MH I-7

Reference: Application, page 6 (lines 1-10)

Please provide a schedule that sets out for each of IFF12 and IFF13 the forecast volumes, revenues and unit revenues for the period 2012/13 through 2017/18 for total exports and total domestic sales.

ANSWER:

Please see the following tables for the requested information.

AVERAGE UNIT REVENUE/COST CALCULATION IFF12

VOLUMES (in GW.h)	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Demand:						
Manitoba Domestic Energy Sales	21748	22330	22547	22781	22987	23336
Domestic energy Losses	3400	3267	3197	3225	3225	2935
Firm & Opportunity Export Sales to Canada	756	830	646	633	633	613
Firm & Opportunity Export Sales to US	8690	8183	6521	6263	6063	5995
Export Transmission Losses	813	804	640	615	595	582
Total Demand Volumes:	**35407**	**35414**	**33551**	**33517**	**33503**	**33461**
Supply:						
MH Hydraulic Generation	32904	32232	30838	30823	30808	30659
MH Thermal Generation	85	84	320	337	332	369
Purchased Energy	2418	3098	2393	2357	2363	2433
Total Supply Volumes:	**35407**	**35414**	**33551**	**33517**	**33503**	**33461**

REVENUE/COST (in milions of dollars)						
Manitoba Domestic Energy Sales @ Approved Rates	1 320.902	1 360.887	1 373.679	1 389.710	1 403.712	1 424.295
Additional Domestic Revenue	0.000	47.631	104.238	164.514	228.182	296.933
Total Manitoba Domestic Energy Sales	1 320.902	1 408.518	1 477.917	1 554.224	1 631.894	1 721.228
Total Export Sales to Canada	28.318	20.902	22.169	24.667	27.638	29.167
Total Export Sales to USA (includes net Trans charges)	267.927	273.052	274.218	307.301	322.984	349.015
Total Export Sales	296.245	293.954	296.387	331.968	350.622	378.182
MH Hydraulic Generation	109.643	107.741	103.029	102.980	102.930	102.433
MH Thermal Generation	6.791	5.674	19.029	22.158	23.354	27.736
Purchased Energy	87.076	111.204	114.321	122.860	129.648	138.848

AVERAGE UNIT REVENUE/COST ($/MW.h))						
Manitoba Domestic Energy Sales @ Approved Rates	$ 60.74	$ 60.94	$ 60.93	$ 61.00	$ 61.07	$ 61.04
Additional Domestic Revenue	-	2.13	4.62	7.22	9.93	12.72
Total Manitoba Domestic Energy Sales @ meter	60.74	63.08	65.55	68.23	70.99	73.76
Total Export Sales to Canada	38.95	28.32	39.93	45.49	50.98	55.83
Total Export Sales to USA	30.83	33.37	42.05	49.06	53.27	58.22
Total Export Sales	31.36	32.61	41.36	48.14	52.36	57.23
MH Hydraulic Generation	$ 3.33	$ 3.34	$ 3.34	$ 3.34	$ 3.34	$ 3.34
MH Thermal Generation	79.89	67.55	59.50	65.70	70.36	75.20
Purchased Energy	36.01	35.90	47.77	52.12	54.88	57.07

AVERAGE UNIT REVENUE/COST CALCULATION IFF13

VOLUMES (in GW.h)	2013/14	2014/15	2015/16	2016/17	2017/18
Demand:					
Manitoba Domestic Energy Sales	21994	22305	22557	22783	22988
Domestic energy Losses	3198	3237	3122	3140	2831
Firm & Opportunity Export Sales to Canada	690	765	580	586	597
Firm & Opportunity Export Sales to US	9998	8921	6583	6437	6600
Net Transmission Losses	925	913	648	628	640
Total Demand Volumes:	**36806**	**36140**	**33490**	**33574**	**33656**
Supply:					
MH Hydraulic Generation	35143	34321	30910	30875	30854
MH Thermal Generation	114	132	348	350	357
Purchased Energy	1548	1687	2232	2348	2444
Total Supply Volumes:	**36805**	**36140**	**33490**	**33574**	**33656**

REVENUE/COST (in milions of dollars)	2013/14	2014/15	2015/16	2016/17	2017/18
Total Manitoba Domestic Energy Sales:					
Manitoba Domestic Energy Sales @ Approved Rates	1 396.088	1 407.672	1 423.207	1 438.093	1 452.299
Additional Domestic Revenue	0.000	55.603	114.654	177.234	243.420
Manitoba Domestic Sales	**1 396.088**	**1 463.275**	**1 537.861**	**1 615.327**	**1 695.719**
Extraprovincial Revenue:					
Total Export Sales to Canada	24.182	23.524	19.281	22.107	25.464
Total Export Sales to USA	350.452	329.129	320.587	345.425	392.816
Other Non-Energy Related Revenues	15.587	11.423	2.416	2.461	2.550
Transmission Credits	18.206	18.834	19.290	19.754	20.568
Extraprovincial Revenue	**408.426**	**382.910**	**361.574**	**389.747**	**441.398**
Water Rentals & Assessments:					
MH Water Rentals	117.480	114.725	103.321	103.204	103.132
Assessments	5.207	5.543	5.721	5.900	6.188
Other Costs	2.213	2.266	2.239	2.258	2.277
Water Rentals & Assessments:	**124.900**	**122.534**	**111.281**	**111.362**	**111.598**
Fuel & Power Purchased:					
MH Thermal Generation	6.495	8.221	21.990	23.134	25.270
Purchased Energy	81.197	82.788	103.001	110.745	119.348
Other Non-Energy related Costs	11.353	8.768	6.804	7.045	7.304
Transmission Charges	45.311	42.530	41.717	47.648	50.630
Fuel & Power Purchased	**144.355**	**142.306**	**173.511**	**188.572**	**202.552**

AVERAGE UNIT REVENUE/COST ($/MW.h))	2013/14	2014/15	2015/16	2016/17	2017/18
Manitoba Domestic Energy Sales @ Approved Rates	$ 63.48	$ 63.11	$ 63.09	$ 63.12	$ 63.18
Additional Domestic Revenue	-	2.49	5.08	7.78	10.59
Total Manitoba Domestic Energy Sales @ meter	63.48	65.60	68.18	70.90	73.77
Total Export Sales to Canada	35.87	34.97	39.38	44.63	50.28
Total Export Sales to USA (includes Net Trans Credits)	32.34	34.24	45.29	49.33	54.97
Total Export Sales	32.56	34.29	44.88	49.00	54.63
MH Hydraulic Generation (Water Rentals)	$ 3.34	$ 3.34	$ 3.34	$ 3.34	$ 3.34
MH Thermal Generation	56.84	62.18	63.19	66.13	70.71
Purchased Energy (Including Assessments)	55.83	52.36	48.71	49.67	51.35

CAC/MH I-8

Reference: Application, page 10 (lines 3-11)

Please provide the average annual residential bill increase over the period 2013-2032 as projected in the Ontario 2013 Long Term Energy Plan.

ANSWER:

The Ontario 2013 Long Term Energy Plan ("the Plan") released on November 2013 provides forecast for an annual typical residential electricity bill for the period 2013-2032, assuming a monthly consumption of 800kWh. The typical residential electricity bills included in the Plan (the electricity bills for the years 2013-2016 are net of Ontario's Clean Energy Benefit credit), and the annual percentage bill increases, derived by Manitoba Hydro, are presented below.

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Bill (Nominal $)	$125	$137	$145	$167	$170	$178	$177	$181	$187	$193
Annual % Increase	-	9.6%	5.8%	15.2%	1.8%	4.7%	(0.6%)	2.3%	3.3%	3.2%

Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Bill (Nominal $)	$188	$191	$194	$198	$200	$202	$204	$205	$207	$210
Annual % Increase	(2.6%)	1.6%	1.6%	2.1%	1.0%	1.0%	1.0%	0.5%	1.0%	1.5%

CAC/MH I-9

Reference: Application, pages 11-14

2012/13 & 2013/14 GRA, PUB/MH I-62

Please update the response to PUB/MH I-62 to include the 2012/13 actual values and the forecast for 2014/15 and 2015/16 based on IFF13.

ANSWER:

Please see the following Operating, Maintenance and Administrative Costs by Business Unit schedule from 2004/05 to 2014/15, with compounded annual growth from 2004/05 to 2012/13 and from 2012/13 through 2014/15.

MANITOBA HYDRO
OPERATING, MAINTENANCE AND ADMINISTRATIVE COSTS BY BUSINESS UNIT

(In thousands of $)	2004/05 Actual	2005/06 Actual	2006/07 Actual	2007/08 Actual	2008/09 Actual	2009/10 Actual	2010/11 Actual	2011/12 Actual	2012/13 Actual	Fiscal 2004/05-2012/13 Compounded Annual Growth**	2013/14 Forecast	2014/15 Forecast	Fiscal 2012/13-2014/15 Compounded Annual Growth**
President & CEO	$ 10,494	$ 10,898	$ 11,867	$ 11,606	$ 11,846	$ 16,773	$ 14,289	$ 14,371	$ 12,648	2.4	$ 13,050	$ 12,859	0.8
General Counsel & Corporate Secretary	5,268	6,111	5,981	5,823	6,912	7,211	7,052	7,248	9,379	7.5	10,491	9,244	(0.7)
Human Resources & Corporate Services	74,210	76,527	82,864	82,594	86,070	89,822	87,986	89,082	93,524	2.9	105,832	110,098	8.5
Corporate Relations	8,004	10,110	9,821	9,991	10,044	10,934	10,994	8,424	9,730	2.5	10,088	10,309	2.9
Finance & Regulatory	14,947	14,735	14,600	15,322	16,005	17,737	17,057	16,845	17,480	2.0	19,662	20,034	7.1
Generation Operations	95,026	92,873	95,993	99,649	107,493	110,054	111,114	112,868	125,394	3.5	135,607	138,275	5.0
Major Capital Projects	731	318	307	184	754	163	267	265	3,051	19.6	5,665	5,924	39.3
Transmission	95,632	101,786	110,537	110,920	124,991	129,107	129,140	131,148	156,442	6.3	160,811	164,644	2.6
Customer Service & Distribution	93,931	98,892	94,011	100,273	105,867	113,295	108,988	112,639	132,330	4.4	134,128	137,318	1.9
Customer Care & Energy Conservation	42,711	42,649	43,314	38,991	39,465	42,931	41,980	43,997	49,624	1.9	57,090	58,361	8.4
Business Unit Total*	**440,953**	**454,898**	**469,297**	**475,354**	**509,446**	**538,027**	**528,867**	**536,889**	**609,602**	**4.1**	**652,425**	**667,065**	**4.6**

*Note: Does not include allocations to capital and Centra Gas.

** Compounded annual growth rates are not meaningful due to accounting and other changes.

CAC/MH I-10

Reference: Application, pages 11-14

2012/13 & 2013/14 GRA, PUB/MH I-59

Using a format similar to that in PUB/MH I-59 d) ii) – please set out and explain the variance between the IFF12 forecast OM&A for 2012/13 and the actual values, by Business Unit.

ANSWER:

Below please find a schedule comparing IFF12 forecast OM&A with actual results for 2012/13. Differences over 5% and $500,000 have been explained.

Please note the overall unfavourable variance in OM&A costs attributable to Electric Operations of $7.6 million for 2012/13 is primarily due to the change in the discount rate for pension and benefit costs.

MANITOBA HYDRO
OPERATING, MAINTENANCE AND ADMINISTRATIVE COSTS
000's

	2012/13 Actual	2012/13 Forecast	Favourable/ (Unfavourable)	%	Ref
President & CEO	$ 12,648	$ 12,966	$ 318	2%	
General Counsel & Corporate Secretary	9,379	8,005	(1,374)	-17%	1
Human Resources & Corporate Services	93,524	94,975	1,451	2%	
Corporate Relations	9,730	10,526	796	8%	2
Finance & Regulatory	17,480	17,915	435	2%	
Generation Operations	125,394	127,377	1,983	2%	
Major Capital Projects	3,051	4,187	1,136	27%	3
Transmission	156,442	151,102	(5,340)	-4%	
Customer Service & Distribution	132,330	134,004	1,674	1%	
Customer Care & Energy Conservation	49,624	51,319	1,695	3%	
Business Unit Subtotal	**609,602**	**612,376**	**2,774**	**0%**	
Motor Vehicle Chargeout	(11,863)	(11,706)	157	1%	
Payroll Tax	(11,584)	(11,494)	90	1%	
Corporate Allocations & Adjustments	20,151	11,716	(8,435)	72%	4
Operating & Administration Charged to Centra	(63,735)	(67,300)	(3,565)	-5%	5
Capitalized Overhead	(79,620)	(78,284)	1,336	2%	
OM&A Costs Attributable to Electric Operations *	**$ 462,951**	**$ 455,308**	**$ (7,643)**	**-2%**	

* Note - OM&A figures do not include subsidiary amounts.

MANITOBA HYDRO
OPERATING, MAINTENANCE AND ADMINISTRATIVE COSTS
2012/13 VARIANCE EXPLANATIONS

Ref	Business Unit	Favourable/ (Unfavourable)	Explanation
1	General Counsel & Corporate Secretary	(1,374)	Mainly due to increased consulting costs related to risk management review and unanticipated insurance claims.
2	Corporate Relations	796	Primarily due to lower consulting and customer & public relations costs as a result of a lower requirement for community participation. In addition, lower research and development costs.
3	Major Capital Projects	1,136	Primarily due to delays in filling various project positions resulting in lower capital activities.
4	Corporate Allocations & Adjustments	(8,435)	Primarily due to the change in discount rate on pension and other benefit costs.
5	Operating & Administration Charged to Centra	(3,565)	Mainly due to lower activities than planned in various programs such as burner tip services and ground maintenance work partly due to vacancies.

CAC/MH I-11

Reference: Application, pages 11-14

a) Please provide a schedule that sets out for the years 2010/11 through 2014/15 (based on actuals and IFF13) the plant in-service and construction in progress at the end of each fiscal year.

ANSWER:

Please see the following table.

IFF13 Electric Capital Assets (In Millions of Dollars)	2010/11	2011/12	2012/13	2013/14	2014/15
Plant In-Service	12 392	13 031	15 162	16 237	17 381
Construction In Progress	2 699	3 094	1 965	2 425	3 296

CAC/MH I-11

Reference: Application, pages 11-14

b) Please provide a schedule that identified the additions to plant in-service in each of these years by major capital spending category. Note: In the case of major generation and transmission projects, please identify each individual project.

ANSWER:

Please see the following table.

	(In Millions of Dollars)				
Electric Capital Assets Additions to Plant In-Service	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**
Hydraulic Generation	136	346	1 464	643	281
Thermal	(8)	1	5	13	9
Transmission lines	10	63	171	21	30
Sub-Stations	221	128	318	116	506
Distribution	149	136	203	209	207
Other	(47)	48	53	132	111
	461	**722**	**2 214**	**1 135**	**1 145**

In the case of major generation and transmission projects, please see Manitoba Hydro's response to PUB/MH I-17.

CAC/MH I-11

Reference: Application, pages 11-14

c) Please provide a schedule that identifies, for each year, those major generation and transmission projects that are contributing to construction in progress at year end and, in each case, how much.

ANSWER:

Please see Manitoba Hydro's response to PUB-MH I-17.

CAC/MH I-12

Reference: Application, page 15

a) Please provide a schedule that explains the difference in forecast OM&A expenses between IFF12 and IFF13 for both 2013/14 and 2014/15 identifying the impact of:

• Changes in assumptions regarding the implementation of IFRS

• Changes (with explanations) in forecast spending by Business Unit.

ANSWER:

Forecast 2013/14 OM&A expenses increased $14M between IFF12 and IFF13 primarily as a result of increased benefit costs due to a decrease in the discount rate used to value post employment expenses.

Forecast 2014/15 OM&A expenses decreased $49M between IFF12 and IFF13 primarily as a result of the IFRS deferral to 2015/16 (decrease $66M) offset by increased benefit costs due to a decrease in the discount rate used to value post employment expenses (increase $15M).

CAC/MH I-13

Reference: Application, pages 15 and 21

Manitoba Hydro's Quarterly Report, December 2013

IFF13, page (i)

a) Please provide the comparative Statements of Income for Manitoba Hydro's Electric Operations for the Nine Months Ended December 31sr 2012 versus 2013.

ANSWER:

Please see the table below.

Manitoba Hydro Electric Operations
Statement of Income
For the nine month period ending December 31

millions of dollars

	2013	2012
Revenues		
General consumers	$ 964	$ 889
Extraprovincial	337	280
Other	12	10
	1 313	1 179
Expenses		
Operating and administrative	351	334
Finance expense	322	333
Depreciation and amortization	310	293
Water rentals and assessments	95	87
Fuel and power purchased	105	96
Capital and other taxes	69	65
Corporate allocations	7	7
	1 259	1 214
Net income (loss) before non-controlling interest	54	(35)
Non-controlling interest	17	8
Net Income (Loss)	$ 71	($ 28)

CAC/MH I-13

Reference: Application, pages 15 and 21

Manitoba Hydro's Quarterly Report, December 2013

IFF13, page (i)

b) It is noted that the overall Corporate net income for the nine months ended December 31, 2013 is more than $100 M higher than that for the previous year ($72 M versus -$38 M). In contrast, Manitoba Hydro's forecast 2013/14 net income is $136 M, less than $50 M higher than the $92 M net income achieved in 2012/13. Please explain/justify why the $136 M net income forecast for 2013/14 and the associated $116 M net income forecast for 213/14 electric operations are reasonable. If not, please provide updated values.

ANSWER:

In comparing the year over year financial results for the nine months ended December 31, 2013 and the forecast for the 12 months ended March 31, 2014, it is important to note that Manitoba Hydro recorded $35 million related to the 1% rate deferral (that was reinstated in Order 43/13 dated April 26, 2013) in revenue in March 2013, which was not included in third quarter results. In addition, there was $10 million of non-recurring other income recorded in 2012/13 that is not expected to reoccur in 2013/14.

CAC/MH I-14

Reference: IFF13, page 7

a) Please reconcile the statement that "OM&A cost increases will be limited to below inflationary levels of 1%" with the post 2014/15 increases in OM&A shown on page 32 through to 2020/21.

ANSWER:

In IFF13, OM&A cost increases between 2015/16 to 2020/21 are limited to below inflationary levels of 1%, exclusive of future accounting changes and in-service of major capital projects as follows:

- The implementation of IFRS as discussed in the response to PUB/MH I-10(a), which is forecast to increase OM&A costs by $47 million in 2015/16; and,
- The annual operating and maintenance impacts of placing Bipole III in-service of $13 million and Keeyask in-service of $15 million.

CAC/MH I-14

Reference: IFF13, page 7

b) Please explain why the OM&A cost increase for 2014/15 was not also limited to "below inflationary levels"

ANSWER:

The OM&A cost increase for 2014/15 was not limited to "below inflationary levels" due to higher pension and other benefit costs.

CAC/MH I-15

Reference: Application, Section 1.0, Summary of Application, page 2 (lines 6 - 19)

Please indicate whether Manitoba Hydro is anticipating seeking a further rate increase at the proposed GRA in the fall of 2014, or simply to confirm the proposed interim rate increase (if granted).

ANSWER:

Please see Manitoba Hydro's response to PUB/MH I-4(a).

CAC/MH I-16

Reference: Board Order 43/13, pages 44 - 45

Please explain the steps taken to increase DSM and load management targets from the 2011 Power Smart Plan, and summarize the steps taken to increase and/or improve DSM programming.

ANSWER:

In accordance with *The Energy Savings Act* and in consultation with the Minister Responsible for Manitoba Hydro, the Corporation recently updated its DSM plan. Attached is a copy of the 2014 – 2017 Power Smart Plan. The three year plan represents a significant increase in DSM activity with three year electricity savings representing 4% of the estimated load forecast by 2016/17, offsetting 86% of the projected load growth during this period.

Manitoba Hydro is currently developing a longer term supplemental DSM Plan to meet the needs of the Corporation's resource planning process and requirements. To reflect DSM targets for resource planning purposes, the Corporation intends to forecast its expectation of DSM savings which will most likely be achieved, and therefore may include energy savings from emerging technologies or other initiatives not specifically noted in the 2014 – 2017 Power Smart Plan.

Power Smart Plan

2014 to 2017



Manitoba Hydro's energy efficiency initiatives for the next three years.

Manitoba Hydro
POWER SMART

2014-2017 Power Smart Plan

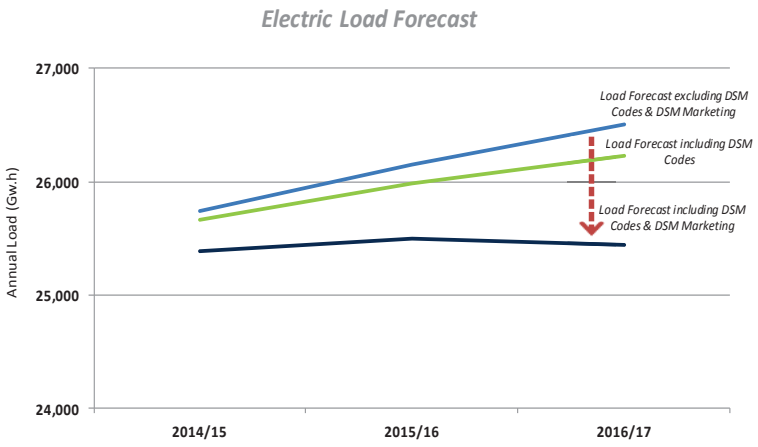
Highlights

Manitoba Hydro has been successfully delivering demand side management (DSM) for over 20 years in an effort to meet the energy needs of Manitoba in a more economic and sustainable manner while assisting customers to use energy more efficiently and to reduce their energy bills. Manitoba Hydro has a strong commitment to DSM with a focus on pursuing all cost effective energy efficiency opportunities and continually monitoring the market for emerging trends and additional opportunities.

To ensure all economic opportunities are being pursued, Manitoba Hydro updates its DSM plan every year. With this year's update, Manitoba Hydro is doubling the targeted electric energy savings to be achieved over the next three years relative to last year's three year plan. These targets will be accomplished by taking a more aggressive approach with existing opportunities and by pursuing some emerging opportunities with new technology developments such as LED lighting. Combined with energy savings achieved to date, these energy savings represent more than the firm generating capability of the proposed new Keeyask Generation Station and equivalent to about double the natural gas needs of Brandon's commercial and residential customers.

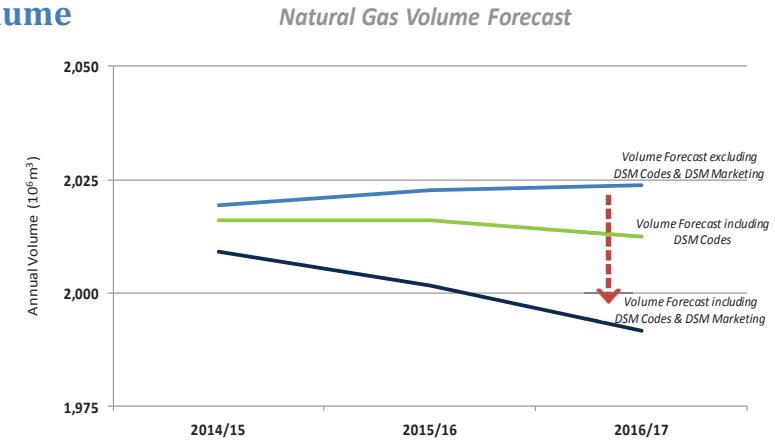
DSM Impacts on Electric Load

Over the next 3 years, the plan sets out to capture electricity savings of 411 MW and 1064 GW.h. This activity represents 4.0% of the estimated load forecast by 2016/17, offsetting 86% of projected load growth during this period.



DSM Impacts on Natural Gas Volume

Over the next 3 years, the plan sets out to capture natural gas savings of 32 million cubic meters. This activity represents 1.6% of the estimated volume forecast by 2016/17, further reducing natural gas consumption in Manitoba.



Neighbourhood Power Smart Projects

Building on the success of the Neighbourhood Power Smart Project in William Whyte and Brandon, Manitoba Hydro is committed to further increase participation to 100 homes each year for the next 3 years. Working with communities like the North End Community Renewal Corporation, lower income customers can benefit from energy efficient upgrades with the assistance of a Community Coordinator and Social Enterprise Contractors completing the retrofits. This community-led initiative helps to reduce barriers to participate through a door-to-door approach and provides employment opportunities to members of the community.

LED Roadway Lighting Conversion Program

Under Manitoba Hydro's new LED Roadway Lighting Conversion Program, the corporation, in working with Manitoba municipalities and local governments, will be converting all High Pressure Sodium (HPS) roadway lighting (less than 1000 W) to energy efficient LED technologies over the next 7 years. This initiative is anticipated to achieve 35 GW.h in electricity savings and 5 MW in winter peak demand savings through a utility investment of $40 million. In addition to energy savings, LED roadway lighting has a longer life than HPS lighting, quick turn on and off, and improved performance in colder temperature settings. LED roadway lighting also provides the added benefit of reduced glare.

Community Geothermal Program

Manitoba Hydro recently launched a Community Geothermal Program and expects to build on the successes achieved to date. The program was launched in June 2013 based on a pilot conducted in partnership with AKI Energy, an Aboriginal social enterprise group focused on building a green economy in First Nations communities. Through the program, Manitoba Hydro works with AKI Energy to coordinate multiple geothermal heat pump installations within a community. Through this approach, installation costs have been substantially reduced and employment opportunities have been created with the participating First Nation community. Manitoba Hydro provides technical guidance, energy bills assessments, and financial support with the Power Smart PAYS Financing Program enabling community members to pay for the majority of the geothermal system through the energy savings that are realized by converting to a geothermal system. Building on the success of installing 108 geothermal systems during 2013 at Fisher River and Peguis First Nation communities, Manitoba Hydro is targeting installing a minimum of 250 geothermal systems during 2014. The target will be accomplished by expanding the number of installations in existing participating communities and broadening the participation to other First Nations communities.

Residential Solar Domestic Water Heating

Water heating is the second largest energy consumer in a home next to space heating. Building upon the partnership with AKI Energy and in an effort to further reduce energy costs for First Nations communities, Manitoba Hydro plans to explore opportunities with AKI Energy for solar domestic water heating applications. During 2014, Manitoba Hydro plans to proceed with a pilot project that involves installing 20 solar water heating systems in homes within a First Nations Community.

Bioenergy District System Feasibility Study

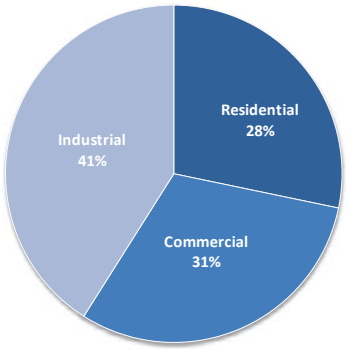
Bioenergy district heating is an alternative method of supplying heat to buildings and communities. In a district heating system, heat is generated at a central location and distributed to customers in the form of hot water via a network of underground insulated pipes. When combined with renewable fuels such as biomass and combined heat and power, district heating may represent an effective method of reducing energy consumption in a community and keeping money in the local economy.

During 2014, Manitoba Hydro intends to undertake a feasibility study to assess the potential for a Bioenergy district system within a First Nation Community.

Electric DSM

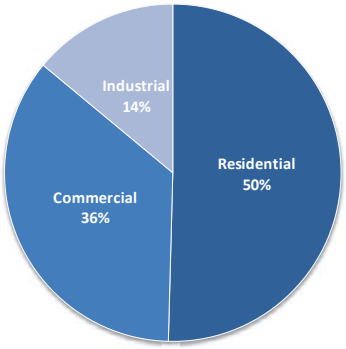
- Targeted electric savings of 411 MW and 1064 GW.h over the next 3 years.
- This activity represents 4.0% of the estimated load forecast by 2016/17.
- Combined with savings achieved to date, total electrical savings of 905 MW and 3,358 GW.h are expected to be achieved to 2016/17.
- These energy savings are equivalent to 1/2 of the electrical energy needs of Winnipeg (excluding industrial customers).
- Over the next 3 years, including other program support and contingency costs, Manitoba Hydro will invest $188 million in electric Power Smart incentive-based programs with an expected cumulative utility investment of $649 million by 2016/17.

Electric Energy Savings
(cumulative to 2016/17)



Natural Gas DSM

Natural Gas Energy Savings
(cumulative to 2016/17)

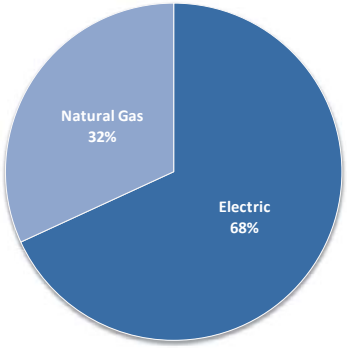


- Targeted natural gas savings of 32 million cubic meters over the next 3 years.
- This activity represents 1.6% of the estimated load forecast by 2016/17.
- Combined with savings achieved to date, total natural gas savings of 133 million cubic meters are expected to be achieved to 2016/17.
- These energy savings are equivalent to about 2 times the natural gas needs of Brandon (excluding industrial customers) or enough natural gas to serve over 56 000 homes.
- Over the next 3 years, including other program support and contingency costs, Manitoba Hydro will invest $47 million in natural gas Power Smart incentive-based programs with an expected cumulative utility investment of $171 million by 2016/17.

Codes & Standards

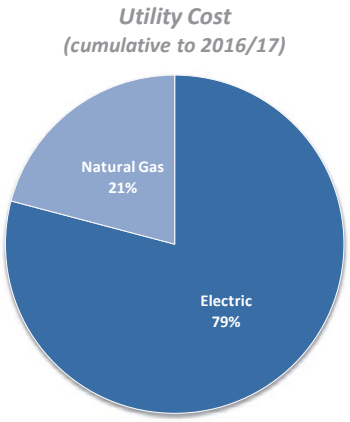
- Included in the DSM targets are electric savings of 81 MW and 284 GW.h and natural gas savings of 11 million cubic meters over the next 3 years.
- These energy savings result from codes and standards currently in place along with new codes and standards in the areas of lighting and new construction which will come into effect over the next 3 years.
- Combined with past efforts, electric savings of 247 MW and 978 GW.h and natural gas savings of 27 million cubic meters are expected to be achieved by 2016/17.

Codes & Standards Energy Savings
(cumulative to 2016/17)



Investment in DSM

- Over the next 3 years, Manitoba Hydro will invest $194 million in Power Smart incentive-based programs with an expected cumulative utility investment of $586 million by 2016/17.
- Including other program support and contingency costs, Manitoba Hydro will invest $235 million in Power Smart initiatives, with an expected cumulative utility investment of $820 million by 2016/17.
- Including participating customer costs, an investment of $400 million (only incentive-based programs) is forecasted, and a total investment of $1.1 billion is expected by 2016/17 – an investment of less than 20% of the proposed Keeyask Generation Station. Customer investments through codes and standards, financing services, and other Power Smart initiatives have not been estimated.

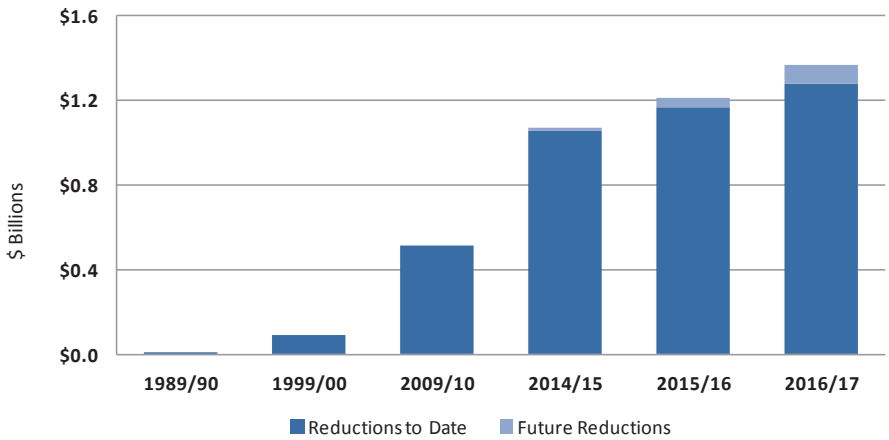


Greenhouse Gas Emission Reductions

- Targeted greenhouse gas emission reductions of 780,000 tonnes over the next 3 years.
- Including reductions achieved to date, 2.5 million tonnes are forecast to be achieved by 2016/17 which is equivalent to taking 500 000 cars off the road for one year.

Customer Bill Reductions

- Power Smart programs will save participating customers an additional $88 million in electricity and natural gas bills during 2016/17.
- Including bill reductions achieved to date, participating customers will save a cumulative $1.4 billion on electric and natural gas bills during 2016/17.



Contents

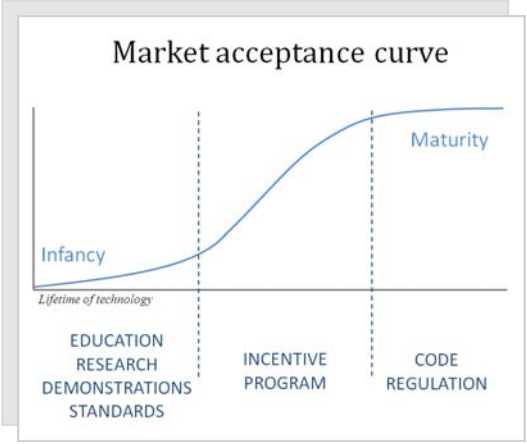
DSM Strategy

Manitoba Hydro's DSM strategy is to aggressively pursue all cost-effective energy efficiency opportunities and continually monitor the market to identify emerging trends and opportunities that may become viable and cost-effective DSM initiatives within the planning horizon.

Manitoba Hydro's DSM initiative, marketed under the Power Smart brand, is designed to encourage the efficient use of energy in residential, commercial, and industrial customer sectors. Manitoba Hydro's overall DSM strategy involves taking a broad approach to capturing energy efficiency opportunities: education to build awareness and understanding, creating foundations through the support of standards, motivating customers with the aid of financial tools, and entrenching energy savings through the support of federal and provincial codes and regulations.

In assessing options for pursing a DSM opportunity, Manitoba Hydro uses a number of metrics as guidelines to assess energy efficient opportunities. These metrics assist in determining whether to pursue an opportunity, how aggressive an opportunity will be pursued, the effectiveness of program design options, and the relative investment sharing between ratepayers and participating customers. These metrics include the Total Resource Cost, Societal Cost, Rate Impact Measure, Levelized Utility Cost, and Customer Simple Payback. 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.

As outlined in the following graph, Manitoba Hydro takes a three stage approach to achieving market transformation. In the infancy stage of emerging opportunities, Manitoba Hydro supports these technologies by building customer awareness, demonstrations, and/or through investments in research and development. As market acceptance increases and the opportunity becomes cost-effective, financial incentives and/or other market intervention strategies are pursued to encourage customers to install the technology. As the product matures and market adoption grows, incentive-based programming generally becomes uneconomic. During this phase, Manitoba Hydro's strategy involves pursuing the remaining opportunities through the adoption of codes and regulations. This latter strategy also ensures permanent market transformation for the specific energy efficiency opportunity.



An Example: Changing Furnace Efficiencies in Manitoba

In 2001, only 30% of all natural gas furnaces being installed in Manitoba were high-efficient models and customer awareness of higher efficiency options was low. In response to this market situation, Manitoba Hydro launched the Power Smart Residential Loan and supporting Home Comfort and Energy Savings campaign to educate and promote the installation of high efficient natural gas furnaces. This approach laid the foundation for customers to consider the energy efficient alternative, and provided a tool for contractors to promote this technology.

In 2005, to further increase market acceptance, a $245 incentive was introduced to encourage customers to choose high efficient natural gas furnaces over the less efficient alternative. By 2007, high efficiency furnaces had grown to represent 76% of all furnaces being replaced in Manitoba homes. In 2008, to accelerate the number of customers upgrading their furnaces, Manitoba Hydro increased their rebate to $500 for a limited time offering and aggressively promoted the financial and comfort benefits of upgrading a furnace.

As market acceptance increased, Manitoba Hydro worked with the Province of Manitoba to develop the framework to regulate the minimum efficiency of all natural gas furnaces installed in Manitoba. On December 30, 2009, with market penetration of 86%, the Power Smart incentive ended and the Provincial regulation took effect requiring a minimum 92% AFUE for natural gas furnaces installed in Manitoba.

Power Smart Plan

Manitoba Hydro's Power Smart Plan is a roadmap for the future direction of the Corporation's energy conservation program. It was developed through an intensive planning process that builds on the Corporation's experience and continuous involvement in energy conservation since 1989. The Power Smart portfolio offers programs and initiatives to pursue opportunities in all market sectors; residential, commercial, and industrial. These programs are designed based on in-depth knowledge of the technology and the market environment. An in-depth understanding is essential to ensure that the program design is adequately and effectively addressing the appropriate target market and contains the tools and strategies to address market barriers.

The following table outlines the forecasted achievements of this 3-year plan:

	1989/90 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
Capacity Savings (MW)	495	243	319	411	**905**
Energy Savings (GW.h)	2,294	363	660	1,064	**3,358**
Natural Gas Savings (million m^3)	101	10	21	32	**133**
Electric Utility Investment (Millions, 2014$)	$461	$54	$60	$74	**$649**
Natural Gas Utility Investment (Millions, 2014$)	$124	$16	$16	$15	**$171**
Total Utility Investment (Millions, 2014$)	$585	$70	$76	$89	**$820**
Customer Investment (Millions, 2014$)	$162	$35	$50	$80	**$327**
Total DSM Investment (Millions, 2014$)	$746	$105	$126	$169	**$1,147**

**Includes estimates for 2013/14*

Residential

Manitoba Hydro offers a number of incentive-based and financial support programs to address opportunities in the residential market.

Incentive-Based Programs

Home Insulation Program

The Home Insulation Program was launched in May 2004 and is scheduled to run until March 31, 2027. The program was designed to encourage homeowners to upgrade insulation levels and air sealing in their homes' attics, walls, and foundations. Upgrading insulation offers significant energy savings, reduces customers' monthly utility bills, and provides a more comfortable living space.

The program targets existing electric and natural gas heated homes with fair or poor insulation levels. Approximately 35 000 electric homes and 129 000 natural gas homes were identified as the overall target market for the program (excluding homes targeted by the Affordable Energy Program). The program has been designed to address barriers to the adoption of energy efficient insulation including the lack of customer awareness regarding the financial and comfort benefits of increased insulation levels, the upfront capital cost of the upgrade, and the lack of priority when compared to more aesthetic and visible renovation projects. These market barriers are addressed through a comprehensive strategy that includes financial incentives to reduce the cost of the upgrade, informational materials in the form of advertising campaigns, and renovation "how to" booklets that provide technical guidance for upgrading insulation to Power Smart levels. Also, in 2014, Manitoba Hydro will be implementing a targeted outreach initiative in electric heated communities, offering in-home energy assessments to assist customers in identifying the highest potential energy efficiency upgrades. Power Smart on-bill financing programs are also promoted to provide additional encouragement for customers that are reluctant to consider allocating their renovation budget towards adding insulation to their home. Homeowners with technical barriers to upgrading insulation, such as finished basements, landscaping, and existing wall configurations, are encouraged to consider an upgrade as a component to an already planned renovation, for example, adding insulation to an exterior wall as part of a re-siding project.

To date, approximately 11 324 electric and 22 709 natural gas homes have undertaken insulation upgrades. The program is forecast to reach 73% of targeted electric customers and 34% of targeted natural gas customers by program end in 2026/27.

	2004/05 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Houses (annual)	34,033	2,664	2,521	2,384	**41,602**
Capacity Savings (MW)	27.3	2.9	5.5	7.8	**35.2**
Energy Savings (GW.h)	55.5	5.4	10.3	14.6	**70.1**
Natural Gas Savings (million m^3)	12.0	0.8	1.5	2.3	**14.2**
Utility Investment (Millions, 2014$)	$35.8	$3.5	$3.4	$3.2	**$45.9**
Customer Investment (Millions, 2014$)	$22.7	$1.1	$1.1	$1.0	**$25.8**
Total DSM Investment (Millions, 2014$)	$58.5	$4.6	$4.4	$4.2	**$71.7**
Estimated Average Annual Bill Reduction per Customer (Electric): $320					
Estimated Average Annual Bill Reduction per Customer (Natural Gas): $151					

**Includes estimates for 2013/14*

Affordable Energy Program

The Affordable Energy Program (AEP) was launched in December 2007. The program's objective is to assist lower income homeowners in implementing energy efficiency upgrades, such as improved insulation, high efficiency natural gas furnaces, and various low cost measures. These upgrades can provide significant energy savings, decreasing the customer's monthly energy bills while increasing the comfort of their home. The criteria for determining program eligibility are the Low Income Cut-Off (LICO) thresholds set by Statistics Canada; customers' total household income must fall below 125% of the LICO thresholds for inclusion in the program. There are approximately 115 000 homes in Manitoba, excluding multi-unit residential buildings, that fall below the LICO 125% threshold; 105 000 customers own their home, while 10 000 customers rent. The primary targets within this market are homes with poor or fair insulation levels and standard efficient furnaces. They make up 22% (25 298) and 18% (20 525) of the market, respectively.

The program was designed recognizing the unique barriers lower income customers face in completing energy efficiency retrofits. Manitoba Hydro assists and encourages participation in this market by minimizing the financial burden with free insulation upgrades and provision of a low cost high efficiency natural gas furnace replacement, along with free low cost items (e.g. CFLs, caulking, faucet aerators). To further encourage participation, the furnace copayment was reduced to $9.50/month from $19, the boiler rebate was increased to $3 000 from $2 500, and the program was expanded to landlords renting to lower income Manitobans. The program is delivered through a number of approaches including direct participation with individual customers or through community groups (e.g. First Nations', Neighbourhood communities, social enterprises). Through these approaches, customers are made aware of the value of energy efficiency retrofits, along with the benefits of participating in the program. Customers are targeted through advertising and community-based campaigns, customized information sessions, and community networks. A community-led initiative, the Neighbourhood Approach, began in fall 2012 with the goal of completing energy efficiency upgrades on a block-by-block basis in lower income neighbourhoods. Under this approach, North End Community Renewal Corporation and Brandon Neighbourhood Renewal Corporation employ local residents and social enterprises, Building Urban Industries for Local Development (BUILD), Brandon Energy Efficiency Program (BEEP), and Inner City Renovation, to bring energy efficiency upgrade opportunities direct to the customer's door.

To date, an estimated 8 072 energy efficiency retrofits have been completed. Of the total retrofits, 5 683 insulation projects have been completed and 3 009 furnaces have been replaced. The program is forecast to reach 66% (16 615) of the targeted homes with poor or fair insulation levels and 50% (10 301) of standard furnaces within the total LICO 125% market by 2026/27.

	2007/08 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
Total Participation (annual)	8,072	2,155	2,180	2,093	**14,500**
No. of Insulation Projects (annual)	5,683	1,249	1,141	1,049	**9,122**
No. of Furnaces Installed (annual)	3,009	680	690	700	**5,079**
No. of Boilers Installed (annual)	75	15	15	15	**120**
Capacity Savings (MW)	6.8	2.1	4.1	6.0	**12.8**
Energy Savings (GW.h)	13.7	3.9	7.6	11.2	**24.9**
Natural Gas Savings (million m^3)	5.7	1.3	2.6	3.8	**9.5**
Utility Investment (Millions, 2014$)	$32.1	$7.5	$7.3	$7.4	**$54.3**
Customer Investment (Millions, 2014$)	$1.0	$3.8	$3.5	$3.2	**$11.5**
Total DSM Investment (Millions, 2014$)	$33.1	$11.3	$10.8	$10.6	**$65.8**

Estimated Average Annual Bill Reduction per Customer - Basic Measures (Electric): $93
Estimated Average Annual Bill Reduction per Customer - Basic Measures (Natural Gas): $25
Estimated Average Annual Bill Reduction per Customer (Electric) - Insulation: $582
Estimated Average Annual Bill Reduction per Customer (Natural Gas) - Insulation: $218
Estimated Average Annual Bill Reduction per Customer (Natural Gas) - Furnace: $231

**Includes estimates for 2013/14*

Water and Energy Saver Program

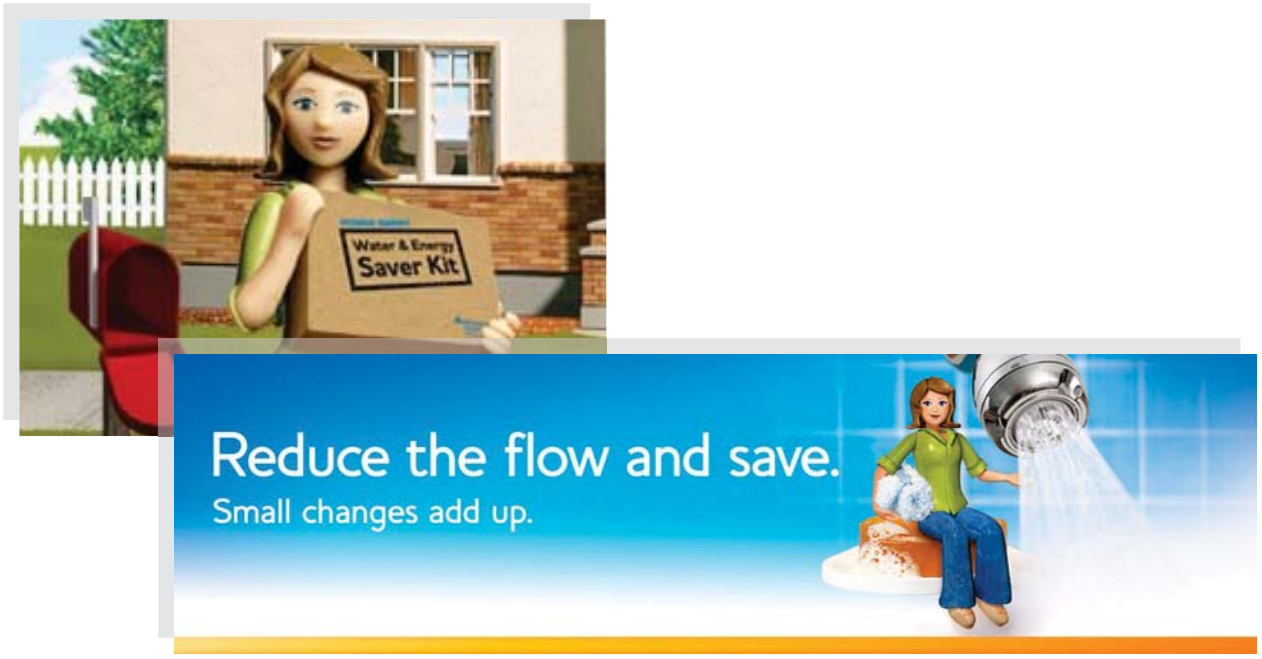
The Water and Energy Saver Program was launched in September 2010. Its primary objective is to reduce residential water heating energy consumption through the use of low flow, energy efficient plumbing fixtures. Customers are offered a free water and energy saver kit with program messaging focused on the energy and water benefits of energy efficient plumbing fixtures. The program offers three channels of participation: mail, targeted direct installation, and a bulk mail option for property managers of multi-unit residential facilities.

The target market includes all residential dwellings that use electricity or natural gas to heat water, totaling 515 000 customers. A lack of awareness of the benefits of energy efficient plumbing fixtures and, for some customers, a perception that their fixtures are already energy efficient, combined with limited availability of Power Smart qualifying products at local retailers, will limit customer adoption of the higher efficiency fixtures. Through advertising and the free kit offering, market acceptance of Power Smart plumbing fixtures will increase.

To date, over 120 000 residential dwellings have participated in the program. The program is on target to reach 40% of targeted homes by program end.

	2010/11 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Houses (annual)	121,367	28,798	28,798	28,798	**207,761**
Capacity Savings (MW)	2.4	0.7	1.3	2.0	**4.3**
Energy Savings (GW.h)	19.2	3.3	6.6	10.0	**29.2**
Natural Gas Savings (million m^3)	3.8	0.8	1.6	2.5	**6.3**
Utility Investment (Millions, 2014$)	$6.8	$1.8	$1.8	$1.8	**$12.3**
Customer Investment (Millions, 2014$)	$0.0	$0.0	$0.0	$0.0	**$0.0**
Total DSM Investment (Millions, 2014$)	$6.8	$1.8	$1.8	$1.8	**$12.3**
Estimated Average Annual Bill Reduction per Kit (Electric): $25					
Estimated Average Annual Bill Reduction per Kit (Natural Gas): $14					

**Includes estimates for 2013/14*



Refrigerator Retirement Program

The Refrigerator Retirement Program was launched in June 2011 with the objective of reducing residential energy consumption through the removal of old, inefficient, and often nearly empty refrigerators and freezers. The program offers free in-home pickup of qualifying working units plus an incentive for the unit.

The target market is residential homes representing approximately 224 000 older second fridges and 222 000 freezers. Customers can save over $100 per year in electricity costs by removing these units. The program encourages customers to retire their secondary appliance and not replace it in order to maximize savings.

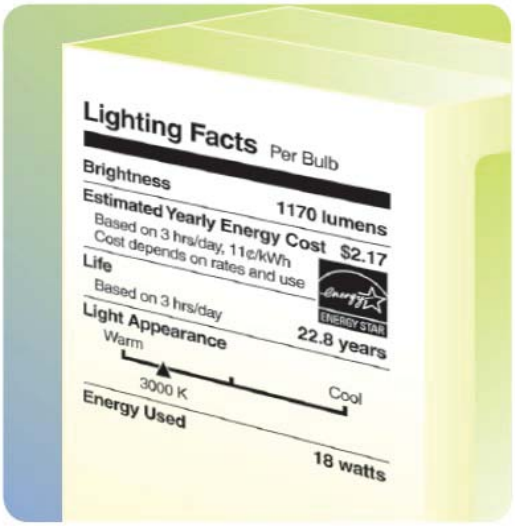
Most customers do not know the costs of operating an underutilized refrigerator or freezer, and many lack assistance in removing the appliance from the home. Through the program, customers are made aware of the costs of their second appliance and the benefits of "retiring" it. The program makes "retiring" easy by providing a convenient in-home pickup service.

To date, over 25 000 units have been retired. The program is forecast to retire 20% of these older fridges and 5% of these freezers by program end.

	2011/12 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
Total Participation (annual)	25,715	11,000	11,000	9,000	**56,715**
No. of Fridges (annual)	21,675	8,000	8,000	7,000	**44,675**
No. of Freezers (annual)	4,040	3,000	3,000	2,000	**12,040**
Capacity Savings (MW)	3.5	1.4	2.8	4.0	**7.5**
Energy Savings (GW.h)	35.9	12.7	25.4	36.0	**71.8**
Utility Investment (Millions, 2014$)	$4.9	$2.3	$2.3	$2.0	**$11.5**
Customer Investment (Millions, 2014$)	$2.7	$1.6	$1.6	$1.3	**$7.1**
Total DSM Investment (Millions, 2014$)	$7.6	$3.9	$3.8	$3.2	**$18.6**
Estimated Average Annual Bill Reduction per Customer (Electric) without fridge replacement: $100					
Estimated Average Annual Bill Reduction per Customer (Electric) without freezer replacement: $70					

**Includes estimates for 2013/14*

Residential LED Lighting Program



The Residential LED Lighting Program is a proposed 5-year program designed to encourage residential customers to choose the most energy efficient lighting technology for each application within their home. The program will aim directly at increasing market adoption of Light Emitting Diode (LED) technologies as a replacement for incandescent and halogen screw-in light bulbs.

The target market includes 530 000 residential dwellings and nearly 17 million screw-based sockets in which LED and other energy efficient lamps can be used. Although consumers are slowly moving toward replacing existing incandescent and halogen bulbs with LEDs as LED prices continue to decrease, the lack of awareness of the benefits and available variety of LED products remain significant barriers to widespread adoption. The proposed program is expected to create a net increase in sales of screw-in LED bulbs in Manitoba by approximately 13% during the course of the campaign.

	2014/15	2015/16	2016/17	Total to 2016/17
No. of Bulbs (annual)	59,939	11,750	56,085	**127,774**
Capacity Savings (MW)	0.6	0.7	1.1	**1.1**
Energy Savings (GW.h)	2.6	2.9	4.4	**4.4**
Utility Investment (Millions, 2014$)	$1.0	$0.2	$0.2	**$1.5**
Customer Investment (Millions, 2014$)	$0.1	$0.0	$0.1	**$0.2**
Total DSM Investment (Millions, 2014$)	$1.1	$0.3	$0.4	**$1.7**
Estimated Average Annual Bill Reduction per Bulb (Electric): $3				

Community Geothermal Program

The Community Geothermal Program aims to reduce customers' electric space heating costs through the adoption of geothermal heat pump systems in First Nations communities. The program is designed to offer a customized approach for each community, with the assistance of AKI Energy, a non-profit social enterprise. To help mitigate the high capital cost barrier, a third-party provider is contracted to conduct a feasibility study and to provide a quote on the bulk purchase of the heat pump units, including installation, resulting in a much lower per unit price than the current market average. Another component of the program includes creating job opportunities and training for First Nations to take part in the installation and the ongoing maintenance of the geothermal systems, with training funded by the First Nation. Manitoba Hydro provides technical guidance, assesses the energy bills to determine which homes would be the most suitable for economic geothermal installations, and explores opportunities to further maximize the number of geothermal installations. Manitoba Hydro's PAYS Financing Program is utilized to enable community members to pay for the majority of the geothermal system through the energy savings that are realized by converting their heating/ air conditioning systems to a geothermal system. For some homes that are close to being able to realize enough energy savings to finance the cost of the geothermal system through the PAYS Financing Program, Manitoba Hydro will provide financial support in order to ensure the energy and financing costs aren't expected to be higher than prior to the geothermal system installation.

It is anticipated that the Community Geothermal Program will increase the adoption of heat pumps in First Nations communities as the total cost of the system will be substantially reduced and the loan will be paid through the energy savings.

	2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Geothermal Systems (annual)	101	300	425	500	**1,326**
Capacity Savings (MW)	0.4	1.2	2.9	5.0	**5.4**
Energy Savings (GW.h)	1.6	4.6	11.1	18.8	**20.4**
Utility Investment (Millions, 2014$)	$0.4	$1.6	$2.0	$2.4	**$6.3**
Customer Investment (Millions, 2014$)	$0.0	$3.1	$4.4	$5.2	**$12.8**
Total DSM Investment (Millions, 2014$)	$0.4	$4.7	$6.5	$7.6	**$19.1**
Estimated Average Annual Bill Reduction per Customer (Electric): $1,005					

**Includes estimates for 2013/14*

Support Programs

Manitoba Hydro offers the following convenient financing programs to support the incentive-based programs by allowing customers to finance initial Power Smart project costs and pay the costs back on their monthly Manitoba Hydro bill.

Power Smart Residential Loan

The Power Smart Residential Loan (PSRL) was launched in March 2001 to provide customers with convenient on-bill financing to assist them in making their home more energy efficient. Under the PSRL, the following energy efficiency improvements can be made to the home: insulation, ventilation equipment, air leakage sealing, windows and doors, and space and water heating equipment.

The target market consists of all electric and natural gas customers in Manitoba. Participants can borrow up to $7 500 ($5 500 for natural gas furnaces) and repay the amount on their energy bill over a term of up to 5 years (up to 15 years for natural gas furnaces and boilers).

	2001/02 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Loans (annual)	75,858	6,000	6,000	6,000	**93,858**
Capacity Savings (MW)	5.6	0.3	0.6	0.9	**6.5**
Energy Savings (GW.h)	10.1	0.6	1.1	1.7	**11.8**
Natural Gas Savings (million m^3)	15.2	0.3	0.6	0.9	**16.1**
Average Loan Amount: $4,666					

**Includes estimates for 2013/14*

Power Smart PAYS Financing

The Power Smart PAYS (Pay As You Save) Financing Program was launched in November 2012 and offers low interest on-bill financing over a term of up to 25 years, depending on the technology financed, with a fixed interest rate for up to 5 years. Energy efficient upgrades that may qualify for financing are:

- Space heating equipment:
  - High efficiency natural gas furnaces;
  - Natural gas boilers (minimum AFUE of 85%);
  - Geothermal heat pump systems;
- Insulation upgrades;
- Drainwater heat recovery systems;
- WaterSense toilets (in conjunction with energy efficient equipment).

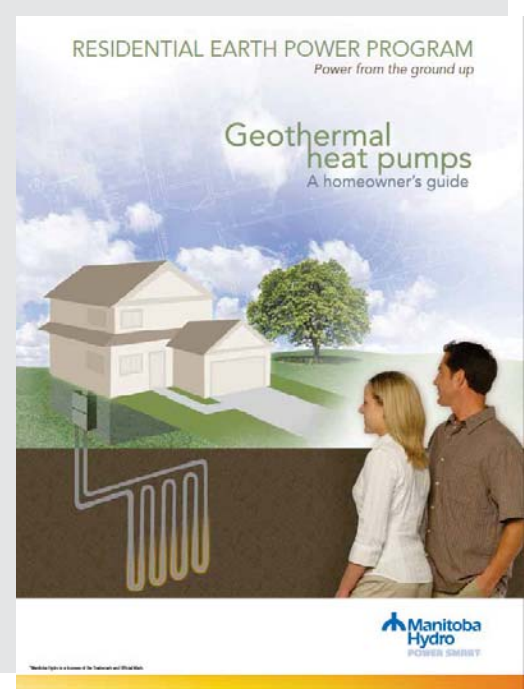
The target market consists of all electric and natural gas customers in Manitoba. This offering complements and supports existing incentive-based programs by assisting customers in managing the installation cost of their upgrade. To qualify, upgrades must have sufficient estimated annual utility bill savings to offset the monthly financing payment, thereby resulting in an energy bill that is less than or equal to the total bill prior to the retrofit. PAYS Financing also differs from Manitoba Hydro's other financing programs in that the loan is transferable between homeowners when a property is sold, and is transferable from a landlord to a tenant where the tenant is responsible for paying the energy bill.

	2012/13 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Loans (annual)	295	553	811	1,157	**2,816**
Capacity Savings (MW)	0.1	0.1	0.3	0.4	**0.5**
Energy Savings (GW.h)	0.4	0.5	0.9	1.4	**1.7**
Natural Gas Savings (million m^3)	0.0	0.0	0.0	0.0	**0.0**
Average Loan Amount: $6,930					

**Includes estimates for 2013/14*

Residential Earth Power Loan

The Residential Earth Power Loan (REPL) was launched in April 2002 to support the adoption of geothermal heat pump technology. Although more expensive to install, geothermal heat pump systems offer significant electricity savings, thereby reducing customers' monthly utility bills. The convenience and flexibility of the on-bill REPL reduces the financial barrier that exists when installing a geothermal heat pump system. The program was also designed to build awareness of emerging technologies and foster new, growing industries that utilize these technologies through educational materials, technical support, and training workshops. Solar hot water systems were added as an eligible technology in 2010.



Customers are eligible for up to $20 000 in financing for installing geothermal heat pump systems or $7 500 in financing for installing solar domestic water heating systems. The financial terms include a 5-year fixed interest rate over a 15-year maximum amortization term. The interest rate for the balance of the financing period is established at Manitoba Hydro's cost of borrowing at the time the fixed interest rate term expires.

	2002/03 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Loans (annual)	1,237	26	26	27	**1,316**
Capacity Savings (MW)	4.4	0.3	0.6	1.0	**5.4**
Energy Savings (GW.h)	14.8	1.3	2.6	4.1	**18.9**
Natural Gas Savings (million m^3)	2.4	0.2	0.4	0.6	**3.0**
Average Loan Amount: $18,728					

**Includes estimates for 2013/14*

Commercial

Manitoba Hydro offers a number of incentive-based programs and one financial support program to address opportunities in the commercial market.

Incentive-Based Programs

Commercial Lighting Program

The Commercial Lighting Program was launched in May 1992 to reduce electricity consumption by accelerating the acceptance and adoption of energy efficient lighting technologies in Manitoba. Commercial, industrial, and agricultural customers are encouraged to install qualifying energy efficient lighting technologies in their facilities to reduce energy bills, improve the quality of lighting, as well as increase safety, security, and productivity. The program offers support through the use of educational materials, information seminars, and financial incentives.

The target market consists of all existing commercial, industrial, and agricultural buildings with inefficient lighting installations in Manitoba, where lighting systems operate a minimum of 2 000 hours per year. New construction projects that do not meet the New Buildings Program eligibility criteria may qualify. The estimated market size is 52 500 lighting projects. Many energy efficient lighting options have higher initial capital costs, and oftentimes customers lack awareness of the technologies available and the non-energy related benefits of energy efficient lighting, thereby creating a barrier to the adoption of higher efficiency systems. In addition, many customers operate in commercial lease space where the person making decisions related to lighting upgrades may not pay the utility bill and therefore, does not realize the direct financial return. Strategies in place to address these market barriers include financial incentives, education and training, as well as hands on technical and customer service support.

To date, over 13 000 energy efficient lighting projects have been completed. The program is forecast to reach 30% of the target market by the end of 2016/17.

	1992/93 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Projects (annual)	13,183	820	860	869	**15,732**
Capacity Savings (MW)	71.2	10.4	21.3	31.5	**102.7**
Energy Savings (GW.h)	389.6	37.4	76.6	113.4	**503.0**
Utility Investment (Millions, 2014$)	$95.4	$8.6	$8.7	$8.4	**$121.1**
Customer Investment (Millions, 2014$)	$37.6	$4.8	$4.9	$5.4	**$52.6**
Total DSM Investment (Millions, 2014$)	$132.9	$13.4	$13.6	$13.7	**$173.7**
Estimated Average Annual Bill Reduction per Customer (Electric): $264					

**Includes estimates for 2013/14*

LED Roadway Lighting Conversion Program

Working with local municipal governments, Manitoba Hydro will convert existing High Pressure Sodium (HPS) roadway lights to Light Emitting Diode (LED) lights over a 7-year period. Manitoba Hydro provides energy and maintenance services to over 130 000 roadway lights across the Province of Manitoba.

The current roadway lighting technology is High Pressure Sodium (HPS), which produces a yellow/orange light and has a 5-year lamp life. The wattages range from 70 to 1 000 and were originally installed in 1991 under a past Power Smart Roadway Lighting Conversion Program to replace Mercury Vapour and Incandescent lighting.

In addition to energy savings, LED roadway lighting has a longer life than HPS lighting, quick turn on and off, and improved performance in colder temperature settings. LED also provides the added benefit of reduced glare as directing the light downward onto the roadway reduces the amount of light that is directed into drivers' eyes.

	2014/15	2015/16	2016/17	Total to 2016/17
No. of Conversions (annual)	18,591	18,150	16,138	**52,879**
Capacity Savings (MW)	0.8	1.7	2.4	**2.4**
Energy Savings (GW.h)	5.8	11.4	16.4	**16.4**
Utility Investment (Millions, 2014$)	$6.2	$6.1	$5.2	**$17.4**
Customer Investment (Millions, 2014$)	$0.0	$0.0	$0.0	**$0.0**
Total DSM Investment (Millions, 2014$)	$6.2	$6.1	$5.2	**$17.4**

Commercial Building Envelope - Windows Program

The Commercial Building Envelope (Windows) Program has been promoting the benefits of energy efficient windows to commercial customers since 1995. The program's primary objective is to improve building envelope performance and reduce energy consumption through the installation of high performance windows in existing buildings.

The target market consists of all existing commercial customers, primarily focused on sectors such as multi-unit residential facilities, schools, hotels/motels, personal care homes, and health care facilities. The program targets facilities planning to replace existing windows, thus presenting an economic opportunity to install higher efficiency Power Smart qualifying windows at the time of replacement.

Market barriers include the incremental product cost of high performance windows, along with a lack of awareness of the significant potential energy savings and other non-energy benefits. Providing financial incentives to help offset incremental material costs, working closely with local fabricators and window suppliers and contractors, while promoting the benefits of high performance windows is effectively addressing these barriers.

It is estimated that there are approximately 750 potential window replacement projects in Manitoba each year, of a total market of 27 000 potential projects. To date, over 1 300 energy efficient window projects have been completed. The program is forecast to reach 8% of the target market by the end of 2016/17.

	2006/07 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Projects (annual)	1,326	234	237	240	**2,037**
Capacity Savings (MW)	6.9	1.1	2.1	3.1	**10.0**
Energy Savings (GW.h)	17.1	2.8	5.4	7.7	**24.8**
Natural Gas Savings (million m^3)	1.9	0.4	0.7	1.0	**2.9**
Utility Investment (Millions, 2014$)	$13.7	$1.8	$1.4	$1.1	**$18.1**
Customer Investment (Millions, 2014$)	$0.1	$0.4	$0.5	$0.5	**$1.5**
Total DSM Investment (Millions, 2014$)	$13.8	$2.3	$1.9	$1.6	**$19.6**

Estimated Average Annual Bill Reduction per Customer (Electric): $895

Estimated Average Annual Bill Reduction per Customer (Natural Gas): $643

**Includes estimates for 2013/14*

Commercial Building Envelope - Insulation Program

The Commercial Building Envelope (Insulation) Program was launched in April 2006. Its primary objective is to improve building envelope performance and reduce energy consumption by upgrading insulation levels in roof and wall areas of existing buildings.

The target market is comprised of all commercial customers with insulation levels that do not meet Power Smart levels. The program targets facilities planning to undergo extensive repairs to existing roofs and walls, presenting an economic opportunity to improve existing insulation levels at the time of renovation.

Market barriers include the incremental product cost of insulation upgrades and a lack of awareness of the significant potential energy savings and other non-energy benefits associated with upgraded insulation levels. Providing financial incentives to help offset incremental material costs and promoting the benefits of better insulated buildings is effectively addressing these barriers.

It is estimated that there are approximately 400 potential insulation replacement projects in Manitoba each year, of a total market of 15 000 potential projects. To date, over 1 300 insulation projects have been completed. The program is forecast to reach 15% of the target market by the end of 2016/17.

	2006/07 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Projects (annual)	1,336	308	313	316	**2,273**
Capacity Savings (MW)	12.5	1.1	2.2	3.0	**15.6**
Energy Savings (GW.h)	25.0	2.8	5.5	7.7	**32.7**
Natural Gas Savings (million m^3)	9.0	0.9	1.8	2.6	**11.7**
Utility Investment (Millions, 2014$)	$13.5	$2.5	$2.5	$2.2	**$20.6**
Customer Investment (Millions, 2014$)	$8.2	$0.6	$0.6	$0.5	**$9.9**
Total DSM Investment (Millions, 2014$)	$21.8	$3.1	$3.1	$2.7	**$30.5**
Estimated Average Annual Bill Reduction per Customer (Electric): $145					
Estimated Average Annual Bill Reduction per Customer (Natural Gas): $197					

**Includes estimates for 2013/14*

Commercial Geothermal Program

The Commercial Geothermal Program was launched in 2007 with the primary objective to encourage the installation of geothermal heat pumps in electrically heated commercial buildings.

The target market consists of new and existing commercial buildings that use conventional electric technologies for space heating. There are approximately 6 084 existing electrically heated facilities using more than 30 000 kW.h per year in Manitoba. There are approximately 200 new commercial buildings constructed each year of which approximately 10% are located in electric heat only territory. It is assumed 243 existing buildings will replace their electric heating systems and 20 new buildings in electric heat only territory will be constructed for a total of 263 potential participants annually. The high capital cost of installing a geothermal heat pump system, combined with the available supply of qualified installers and contractors in some regions of the province; challenging drilling and trenching conditions due to varying geological conditions; limited land area of many properties to accommodate the loop installation; and the proximity to the ground loop of underground facilities and services (water and sewer lines that may freeze, etc.) can make choosing geothermal as a heating/cooling option more challenging for the customer. Through the program, customers are provided with information on how the geothermal heat pump technology works, the energy savings available, and other benefits to increase understanding and acceptance of the technology. Financial incentives are offered to help offset the higher capital costs of the system. Incentives are also available to support feasibility studies to ensure the project meets the heating and cooling needs of the building while achieving the necessary electrical savings that make installing a geothermal heat pump an economic option for the customer. Benefits of geothermal systems and program opportunities are communicated through the broad network of engineers, architects, consultants, contractors, and trade allies in Manitoba who have established relationships with the commercial and industrial customer base.

To date, approximately 131 commercial buildings have installed geothermal systems. The program is forecast to achieve 50% of annual heating systems upgrades being geothermal by 2028/29.

	2007/08 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Buildings (annual)	131	33	39	47	**250**
Capacity Savings (MW)	14.7	0.4	1.4	2.7	**17.4**
Energy Savings (GW.h)	35.4	1.8	6.0	11.1	**46.5**
Utility Investment (Millions, 2014$)	$5.7	$1.0	$2.0	$2.4	**$11.1**
Customer Investment (Millions, 2014$)	$17.7	$0.4	$0.9	$1.1	**$20.0**
Total DSM Investment (Millions, 2014$)	$23.4	$1.4	$2.9	$3.4	**$31.1**
Estimated Average Annual Bill Reduction per Customer (Electric): $5,145					

**Includes estimates for 2013/14*

Commercial HVAC Program - Boilers

The Commercial HVAC Program for Boilers is a 10-year program launched in April 2006. The program's primary objective is to transform the commercial boiler market in Manitoba by increasing awareness and adoption of energy efficient condensing and near-condensing boilers. Energy efficient boilers offer significant natural gas savings, reducing customers' monthly utility bills. The program focuses on educating building owners and operators about the benefits of energy efficient equipment and works with industry contractors, engineers, consultants, designers, and equipment dealers to promote these systems. Financial incentives ranging from $2/MBH (thousands of BTUs per hour) to $8/MBH are provided for qualifying systems.

The program is designed to build market acceptance prior to, thereby ensuring the successful adoption of, Natural Resources Canada's (NRCan) minimum efficiency regulations for commercial boilers, which are currently under development.

The primary target market consists of commercial buildings with existing heating equipment at or approaching end of life. On average, 282 commercial boilers are installed annually in existing buildings. Boiler replacements are not likely to occur until existing equipment is near the end of its life and are often completed in an emergency situation during the heating season. Therefore, purchase decisions are made with limited lead time and primarily based on the initial capital cost, not considering the annual operating costs of the system over its 25-year life. Condensing or near-condensing natural gas boilers are also more expensive to install than conventional boilers, and require modifications to the ventilation system. Financial incentives combined with information on the lifecycle cost-advantage of energy efficient systems are in place to address these market barriers.

The program is forecast to achieve 42% of the target market being energy efficient by the planned program end date of March 31, 2016. The program will pursue provincial regulations requiring all boilers installed in new buildings in Manitoba to be condensing by April 1, 2016.

	2006/07 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Boilers (annual)	929	126	133	0	**1,188**
Natural Gas Savings (million m^3)	9.2	1.0	2.1	2.3	**11.5**
Utility Investment (Millions, 2014$)	$9.7	$1.1	$1.2	$0.0	**$12.0**
Customer Investment (Millions, 2014$)	$6.6	$0.6	$0.4	$0.2	**$7.8**
Total DSM Investment (Millions, 2014$)	$16.3	$1.7	$1.6	$0.2	**$19.8**
Estimated Average Annual Bill Reduction per Customer (Natural Gas): $2,088					

**Includes estimates for 2013/14*

Commercial HVAC Program - Chillers

The Commercial HVAC Program for Chillers is a 16-year program launched in April 2006. Its primary objective is to transform the commercial chiller market in Manitoba by increasing awareness and adoption of energy efficient water-cooled chillers and variable speed drive retrofits. Energy efficient chillers offer significant electricity savings, reducing customers' utility bills. The program focuses on educating building owners and operators about the benefits of energy efficient equipment and works with industry contractors, engineers, consultants, designers, and equipment dealers to promote these systems. Financial incentives are provided for qualifying units.

The primary target market for chillers are large, older, commercial buildings, consisting primarily of large offices, large multi-unit residential facilities, hospitals, and large educational facilities. The high initial cost of chiller systems combined with the tendency of customers to emphasize the initial investment cost over operating efficiency or lifecycle costs when making their purchase decision, have created a barrier for the higher efficiency systems. Offering aggressive financial incentives and promoting the lifecycle cost-advantage are effectively addressing these barriers and ensuring that efficient chillers are chosen at the time of existing equipment replacement.

Typically, chillers have a 30-year life and are replaced when the refrigerant must be changed or when the equipment is reaching the end of its life. On average, 14 chillers, representing approximately 4 300 tons of cooling capacity, are replaced annually. The program is forecast to achieve 66% of chiller sales being energy efficient by the end of 2016/17.

	2006/07 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Chillers (annual)	70	10	10	11	**101**
Capacity Savings (MW)	0.0	0.0	0.0	0.0	**0.0**
Energy Savings (GW.h)	12.2	2.5	4.0	5.6	**17.7**
Utility Investment (Millions, 2014$)	$1.9	$0.3	$0.3	$0.3	**$2.8**
Customer Investment (Millions, 2014$)	$2.0	$0.1	$0.1	$0.2	**$2.4**
Total DSM Investment (Millions, 2014$)	$3.8	$0.5	$0.4	$0.5	**$5.2**
Estimated Average Annual Bill Reduction per Customer (Electric): $11,400					

**Includes estimates for 2013/14*

Commercial HVAC Program - CO_2 Sensors

The Commercial HVAC Program for CO_2 Sensors is a 15-year program launched in April 2009. Its primary objective is to increase the awareness and adoption of CO_2 sensors in commercial facilities. CO_2 sensors reduce energy consumption by matching ventilation supply to occupant demand, thereby reducing customers' monthly utility bills. CO_2 sensors also improve occupant comfort by providing more consistent air quality and can extend the life of heating and cooling equipment by putting less demand on these systems.

The target market for CO_2 sensors consists of over-ventilated commercial facilities with variable occupancy and that have, or are considering installing, Direct Digital Control systems or rooftop units to control heating, cooling, and ventilation. Installations typically occur when other major renovations are being made to the ventilation system. It is estimated that a total of 277 potential sensor installations in Manitoba exist each year.

CO_2 sensors are not required in commercial building operation and therefore are often one of the first retrofit measures to be discarded in the event of budgetary constraints. Customers also tend to be unfamiliar with the operation of their ventilation systems and may be unaware of when a building is over-ventilated. Offering aggressive financial incentives combined with the promotion of the lifecycle cost-advantage and improved ventilation benefits, is effectively addressing these barriers.

	2009/10 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Sensors (annual)	241	152	199	238	**830**
Capacity Savings (MW)	0.0	0.1	0.2	0.3	**0.3**
Energy Savings (GW.h)	0.3	0.1	0.2	0.4	**0.7**
Natural Gas Savings (million m^3)	0.8	0.1	0.3	0.5	**1.3**
Utility Investment (Millions, 2014$)	$0.1	$0.2	$0.2	$0.2	**$0.6**
Customer Investment (Millions, 2014$)	$0.2	$0.0	$0.0	$0.0	**$0.3**
Total DSM Investment (Millions, 2014$)	$0.3	$0.2	$0.2	$0.2	**$1.0**
Estimated Average Annual Bill Reduction per Customer (Electric): $40					
Estimated Average Annual Bill Reduction per Customer (Natural Gas): $463					

**Includes estimates for 2013/14*

Commercial HVAC Program - Water Heaters

The Commercial HVAC Program for Water Heaters is a 10-year program targeted to be launched in spring 2015. The program's primary objective is to advance transformation of the commercial water heater market in Manitoba prior to federal regulations taking effect by increasing awareness and adoption of energy efficient condensing water heaters. Water heating typically represents 11% of a commercial building's energy consumption, but can be as high as 40% for high-use sectors such as car washes and laundromats. Upgrading to a condensing water heater can reduce water heating energy use by up to 28%. The proposed program will focus on educating building owners and operators about the benefits of energy efficient equipment and will work with industry contractors, engineers, consultants, designers, and equipment dealers to promote these systems.

The program is designed to build market acceptance prior to, and thereby ensuring the successful adoption of, Natural Resources Canada's (NRCan) minimum efficiency regulations for commercial water heaters, which are currently under development.

The primary target market consists of commercial buildings with high levels of water usage with existing water heating equipment at or approaching end of life. On average, 286 commercial water heaters are installed annually in existing buildings. Water heater replacements most often only occur when existing equipment is near its end of life and are often completed in an emergency situation. Purchase decisions are therefore made with limited lead time and primarily based upon the initial capital cost, not considering the annual operating costs of the system over the product lifecycle. Condensing water heaters are also more expensive to install than conventional water heaters because they typically require modifications to the ventilation system. Financial support combined with information on the lifecycle cost advantage of energy efficient systems are proposed to address these market barriers.

The program is forecast to achieve 80% of annual water heater sales being energy efficient in the final year of the program. The program will pursue provincial regulations requiring all water heaters, including tankless systems, installed in new buildings within Manitoba to be condensing by April 1, 2025.

	2014/15	2015/16	2016/17	Total to 2016/17
No. of Water Heaters (annual)	0	19	31	**50**
Natural Gas Savings (million m^3)	0.0	0.0	0.1	**0.1**
Utility Investment (Millions, 2014$)	$0.0	$0.1	$0.1	**$0.2**
Customer Investment (Millions, 2014$)	$0.0	$0.1	$0.1	**$0.1**
Total DSM Investment (Millions, 2014$)	$0.0	$0.1	$0.2	**$0.3**
Estimated Average Annual Bill Reduction per Customer (Natural Gas): $207				

Commercial Custom Measures Program

The Commercial Custom Measures Program was launched in 2006 to encourage commercial customers to explore and implement energy efficient upgrades to their operations or facilities. This program offers the opportunity to explore customer-specific and unique projects or newer technologies that are not currently eligible under the other Power Smart for Business Program offerings. Technologies and projects may include digital control systems, hot water and space heating equipment, waste energy recovery systems, variable speed drive systems, and solar air and water heating systems. The program provides incentives to help cover the cost of feasibility studies that are often required for larger projects and newer or emerging technologies, and implementation incentives based on projected savings from the project.

The program targets all commercial customers planning new construction, renovation or expansion projects. Often the high incremental cost of energy efficient technologies and systems, customer uncertainty of payback, and lack of awareness of energy efficient alternatives limit a customer's propensity to invest in an energy efficient project. The Commercial Custom Measures Program addresses these barriers by promoting new and innovative technologies, offering a feasibility study incentive to provide confidence in energy savings estimates, and offering incentives to help reduce the implementation cost.

	2006/07 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Projects (annual)	78	14	15	15	**122**
Capacity Savings (MW)	1.9	0.3	0.6	0.9	**2.8**
Energy Savings (GW.h)	25.4	1.1	2.2	3.4	**28.7**
Natural Gas Savings (million m^3)	1.4	0.1	0.2	0.3	**1.7**
Utility Investment (Millions, 2014$)	$4.4	$0.6	$0.7	$0.7	**$6.4**
Customer Investment (Millions, 2014$)	$12.6	$0.6	$0.6	$0.6	**$14.3**
Total DSM Investment (Millions, 2014$)	$16.9	$1.2	$1.2	$1.3	**$20.6**
Estimated Average Annual Bill Reduction per Customer (Electric): $4,646					
Estimated Average Annual Bill Reduction per Customer (Natural Gas): $6,427					

**Includes estimates for 2013/14*

Commercial Building Optimization Program

The Commercial Building Optimization Program (CBOP) was launched in 2006 to encourage commercial customers with existing buildings to engage in an assessment and adjustment process known as retrocommissioning (RCx) to help return their buildings' mechanical systems to their designed operating characteristics and even further optimize their operation to save energy and improve occupant comfort. The program focuses on identifying non-capital intensive energy conservation opportunities with relatively short payback periods and offers incentives that cover a portion of the cost of hiring an RCx agent and implementing the energy efficient measures identified through the investigation process.

The market consists of existing commercial buildings larger than 50 000 square feet and between 2 to 25 years of age with direct digital control systems and functioning heating, ventilating, and air conditioning mechanical systems. There are approximately 470 buildings in this market, however, there are significant barriers that must be overcome to reach these customers including the lack of experience and availability of RCx providers in Manitoba, lack of customer awareness of the cost-saving benefits of RCx, and lack of customer time and competing priorities for capital to invest in energy efficiency projects. The program addresses these barriers by providing training and information sessions for potential and existing RCx providers, promoting RCx at relevant industry events, and offering incentives to reduce the capital cost and payback cycle of the RCx process.

	2006/07 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Buildings (annual)	15	4	4	6	**29**
Capacity Savings (MW)	0.0	0.1	0.2	0.4	**0.5**
Energy Savings (GW.h)	5.2	0.6	1.2	2.1	**7.3**
Natural Gas Savings (million m^3)	0.7	0.1	0.2	0.5	**1.2**
Utility Investment (Millions, 2014$)	$2.2	$0.5	$0.4	$0.5	**$3.5**
Customer Investment (Millions, 2014$)	$0.2	$0.1	$0.1	$0.2	**$0.6**
Total DSM Investment (Millions, 2014$)	$2.3	$0.6	$0.5	$0.7	**$4.1**
Estimated Average Annual Bill Reduction per Customer (Electric): $8,840					
Estimated Average Annual Bill Reduction per Customer (Natural Gas): $10,779					

**Includes estimates for 2013/14*

New Buildings Program

The New Buildings Program is an 8-year program that began in 2010. Its primary objective is to transform the commercial new construction industry in preparation for pending building codes which will require significant improvements in overall building energy efficiency. The program offers technical assistance and financial incentives for customers designing and constructing new, energy efficient commercial buildings.

The provincial government has adopted the National Energy Code of Canada for Buildings (NECB) 2011 into the Manitoba building code. Coming into force December 1, 2014, this adoption will have a significant impact on the energy efficiency of new commercial buildings and will affect many disciplines in Manitoba's construction industry, including the code enforcement authorities.

Two incentive options are currently offered to all customers: The Prescriptive Path, which specifies minimum design criteria for common building types or the Custom Design Path, which offers building designers flexibility to create energy efficient buildings. Power Smart buildings are designed to use at least 33% less energy than similar buildings designed to meet the Model National Energy Code of Canada for Buildings 1997 (MNECB 97). Custom Design Path participants are eligible for an energy modeling incentive and are also given the option to enroll in the Proven Performance Path which provides further incentives for energy efficiency beyond the program's minimums. The target market is all new commercial buildings constructed in Manitoba and represents approximately 200 new commercial building projects in the province each year. In order to move the market toward the energy efficiency requirements proposed under the upcoming building code, the industry faces fundamental changes to the current methods of designing, constructing, and commissioning commercial buildings. A lack of qualified, local firms offering integrated design, energy modeling, and building commissioning; industry perceptions of higher initial capital costs associated with designing and constructing energy efficient buildings; and a lack of customer and industry knowledge about lifecycle costing creates barriers to constructing energy efficient buildings. To help overcome these barriers, Manitoba Hydro has worked closely with the Province's Green Building Coordination Team to develop the Green Building Policy for Government of Manitoba Funded Projects. This policy ensures the Province's investments in new construction will help transform the local market by leading by example, and will help build industry capacity within Manitoba. Program efforts are focused on larger and more complex projects in order to showcase the benefits of energy efficient buildings to a broader audience on a larger scale. Providing financial incentives along with industry training and support aids in addressing these barriers.

To date, there have been 33 buildings constructed that meet the Power Smart requirement of at least 33% more energy efficient than the MNECB 97. In addition to these completed projects, another 51 projects are currently registered to participate. The program is forecast to achieve a market penetration rate of 25% of annual buildings constructed being energy efficient in 2016/17.

	2009/10 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Buildings (annual)	33	30	40	50	**153**
Capacity Savings (MW)	1.4	4.6	10.8	18.6	**20.0**
Energy Savings (GW.h)	7.7	10.5	24.4	41.9	**49.6**
Natural Gas Savings (million m^3)	2.8	0.3	0.7	1.2	**4.0**
Utility Investment (Millions, 2014$)	$3.8	$3.1	$3.9	$4.5	**$15.3**
Customer Investment (Millions, 2014$)	$3.1	$6.7	$8.9	$11.2	**$29.9**
Total DSM Investment (Millions, 2014$)	$6.9	$9.8	$12.8	$15.7	**$45.2**
Estimated Average Annual Bill Reduction per Customer (Electric): $18,921					
Estimated Average Annual Bill Reduction per Customer (Natural Gas): $2,311					

**Includes estimates for 2013/14*

Commercial Refrigeration Program

The Commercial Refrigeration Program was launched in 2006 to encourage commercial customers to reduce energy consumption by providing over 15 different product incentives for energy efficient upgrades to refrigeration display cases, walk-in boxes, mechanical rooms, and lighting. Savings are achieved by providing customers with information about best practices and maintenance, promoting energy efficient refrigeration technologies, and optimizing the operation of new and existing refrigeration equipment.

The target market is commercial customers with foodservice refrigeration equipment, primarily grocery, retail, and convenience stores. Many of the qualifying energy efficient refrigeration systems have higher incremental costs, and equipment upgrade decisions are sometimes based on aesthetics over energy efficiency. Offering financial incentives to lower incremental costs and promoting the energy and associated bill savings along with non-energy benefits of efficient refrigeration systems, such as increased comfort in refrigeration aisles for both customers and employees, reduced product spoilage, and extended equipment life for refrigeration motors and compressors, is effectively addressing these barriers.

	2006/07 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Locations (annual)	1,046	367	208	60	**1,681**
Capacity Savings (MW)	4.8	1.3	2.0	2.4	**7.2**
Energy Savings (GW.h)	32.6	11.7	17.9	21.3	**53.9**
Utility Investment (Millions, 2014$)	$3.0	$1.7	$1.5	$0.3	**$6.6**
Customer Investment (Millions, 2014$)	$3.6	$0.1	$0.1	$0.1	**$3.9**
Total DSM Investment (Millions, 2014$)	$6.6	$1.8	$1.6	$0.5	**$10.5**
Estimated Average Annual Bill Reduction per Customer (Electric): $1,673					

**Includes estimates for 2013/14*

Commercial Kitchen Appliance Program

The Commercial Kitchen Appliance Program was launched in 2008 to encourage customers to choose ENERGY STAR steam cookers (gas and electric) and ENERGY STAR deep fat fryers (gas only) when replacing commercial appliances.

The target market for steam cookers and deep fat fryers consists of restaurants and foodservice establishments with either gas or electric commercial kitchen appliances. ENERGY STAR qualified appliances have a higher initial cost to purchase, and many customers are not aware that using ENERGY STAR appliances can decrease operating and maintenance costs and improve food quality. Providing financial incentives and promoting the various energy and non-energy benefits of ENERGY STAR kitchen appliances is effectively addressing these market barriers.

Manitoba Hydro is also currently investigating the opportunity to reintroduce pre-rinse spray valves - a previously offered initiative. The technology has evolved to offer a more efficient spray valve option, thereby creating an opportunity to achieve further energy savings.

	2008/09 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Appliances (annual)	107	630	834	1,187	**2,758**
Capacity Savings (MW)	0.2	0.7	1.7	3.1	**3.3**
Energy Savings (GW.h)	0.9	0.7	1.5	2.7	**3.5**
Natural Gas Savings (million m^3)	0.1	0.2	0.5	1.0	**1.1**
Utility Investment (Millions, 2014$)	$0.5	$0.2	$0.2	$0.2	**$1.1**
Customer Investment (Millions, 2014$)	$0.2	$0.0	$0.1	$0.1	**$0.3**
Total DSM Investment (Millions, 2014$)	$0.6	$0.2	$0.3	$0.3	**$1.4**
Estimated Average Annual Bill Reduction per Customer (Electric): $452					
Estimated Average Annual Bill Reduction per Customer (Natural Gas): $137					

**Includes estimates for 2013/14*

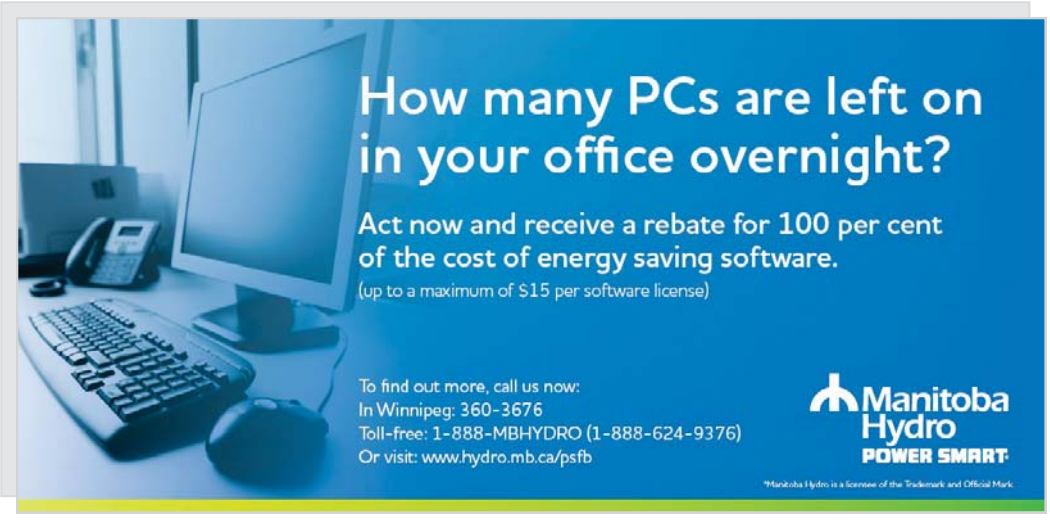
Network Energy Management Program

The Network Energy Management Program was launched in 2009 to encourage customers to install program-approved software that conserves energy by sending personal computers (PCs) into a mode that consumes less energy when they are not in use. The program is aimed at commercial organizations that manage a network of PCs.

The target market is comprised of approximately 2 500 physical locations in the school/college and office sectors, representing approximately 300 000 PCs. Installation, configuration, and testing of this new software on existing networks can require a significant time investment. Although management may realize operational cost savings, IT staff are often cautious when implementing software that they perceive may in any way restrict their ability to access individual PCs remotely to perform maintenance and system upgrades. The program provides financial incentives and promotes the product benefits through direct marketing to both management and IT staff in order to address these barriers to adoption.

	2009/10 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Licenses (annual)	4,631	3,343	5,562	7,784	**21,320**
Capacity Savings (MW)	0.1	0.2	0.5	1.0	**1.0**
Energy Savings (GW.h)	0.8	0.5	1.4	2.5	**3.3**
Utility Investment (Millions, 2014$)	$0.3	$0.1	$0.1	$0.1	**$0.6**
Customer Investment (Millions, 2014$)	$0.0	$0.1	$0.1	$0.1	**$0.2**
Total DSM Investment (Millions, 2014$)	$0.2	$0.1	$0.2	$0.3	**$0.8**
Estimated Average Annual Bill Reduction per Customer (Electric): $4,929					

**Includes estimates for 2013/14*



Internal Retrofit Program

The Internal Retrofit Program (IRP) was launched in 1993 with the goal of retrofitting all Manitoba Hydro buildings to Power Smart levels during planned renovations and initiating energy efficiency improvements to corporate facilities when cost-effective to do so. The program assists with funding associated with the implementation of energy efficient measures including lighting, building envelope, HVAC, water, and custom measures. The program also ensures that newly constructed Manitoba Hydro facilities meet the requirements outlined in the Manitoba Green Building Policy. The program's target market is all existing Manitoba Hydro buildings that do not meet Power Smart levels, including generating stations, commercial buildings, and corporate housing. There are approximately 1000 Manitoba Hydro buildings province-wide and the program aims to have 100% of these facilities satisfy Power Smart requirements. To date, the Internal Retrofit Program has achieved energy savings of over 41 GW.h. The program end date is planned for the end of the 2017/18 fiscal year.

	1992/93 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Projects (annual)	1,316	49	68	56	**1,489**
Capacity Savings (MW)	10.5	0.2	0.4	0.5	**11.0**
Energy Savings (GW.h)	41.9	1.3	2.4	3.3	**45.3**
Natural Gas Savings (million m^3)	0.0	0.0	0.0	0.0	**0.0**
Utility Investment (Millions, 2014$)	$13.0	$0.9	$0.9	$0.8	**$15.5**

**Includes estimates for 2013/14*

Power Smart Shops Program

The Power Smart Shops Program is intended to promote energy efficiency to small commercial customers including restaurants, food retail, non-food retail/services, and small offices. The program proposal will explore an outreach model to assist customers in saving energy through the free installation of low cost energy efficient faucet aerators and low flow pre-rinse spray valves as well as a free lighting assessment and written report that identifies opportunities to save energy by retrofitting inefficient lighting. Packaging Power Smart PAYS Financing along with Power Smart incentives for lighting and other energy efficient opportunities is expected to mitigate the upfront capital cost market barriers. The proposed program is expected to make upgrading easy and convenient for the customer.

This particular market segment is a proven late adopter of energy efficient technologies due to a number of unique barriers that have not been specifically addressed by existing Power Smart for Business programs. Limited resources, costs of upgrades, and lack of industry exposure are all barriers that the Power Smart Shops Program aims to help overcome. The program will also provide customers with information on other energy saving technologies and low/no cost energy saving tips.

	2009/10 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Projects (annual)	708	0	108	367	**1,184**
Capacity Savings (MW)	0.2	0.0	0.1	0.2	**0.4**
Energy Savings (GW.h)	0.8	0.0	0.2	0.8	**1.6**
Natural Gas Savings (million m^3)	0.0	0.0	0.0	0.0	**0.0**
Utility Investment (Millions, 2014$)	$0.7	$0.0	$0.1	$0.2	**$1.1**
Customer Investment (Millions, 2014$)	$0.0	$0.0	$0.0	$0.1	**$0.1**
Total DSM Investment (Millions, 2014$)	$0.8	$0.0	$0.2	$0.3	**$1.2**
Estimated Average Annual Bill Reduction per Customer (Electric): $36					
Estimated Average Annual Bill Reduction per Customer (Natural Gas): $6					

**Includes estimates for 2013/14*

Support Program

The following convenient financing program offered by Manitoba Hydro supports the incentive-based programs by allowing customers to finance initial project costs and pay these costs back on their monthly Manitoba Hydro bill.

Power Smart for Business PAYS Financing

The Power Smart for Business PAYS (Pay As You Save) Financing Program was launched in September 2013. The program's objective is to assist commercial customers in reducing their energy and water consumption by offering extended financing terms for energy efficiency upgrades such as T8, T5, and LED lighting, high efficiency natural gas furnaces, condensing and near-condensing boilers, insulation, geothermal systems, CO_2 sensors, custom measures (commercial and industrial applications), and WaterSense® labeled toilets and urinals. This offering compliments and supports the various incentive-based programs by assisting customers in managing the installation cost of their upgrade.

To qualify, upgrades must have sufficient estimated annual utility bill savings to offset the monthly financing repayment, thereby resulting in an energy bill that is slightly less than the total bill prior to the retrofit. The target market for this program consists primarily of small business owners and tenants as well as government, school and municipal buildings. Financing will be available for extended terms with 20 to 25 year amortization periods dependent on the upgrade, with the interest rate being fixed for the first 5 years. These are projects that would not likely have occurred without the availability of this convenient and flexible financing offering.

	2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Loans (annual)	24	25	35	28	**112**
Capacity Savings (MW)	0.7	0.1	0.1	0.2	**0.9**
Energy Savings (GW.h)	2.5	0.3	0.5	0.8	**3.3**
Natural Gas Savings (million m^3)	0.0	0.0	0.1	0.1	**0.0**
Average Loan Amount: $13,104					

**Includes estimates for 2013/14*

Industrial

Manitoba Hydro offers incentive-based programs to address opportunities within the industrial market. These programs take a customer-focused approach to identify and address operating and production challenges in a manner that not only improves overall energy efficiency, but enhances productivity and competitiveness for Manitoba industry.

Manitoba's industrial market can be characterized as consisting of a large variety of industries with a broad size demographic of customers within each classification. While some sectors are responsible for higher percentages of consumption than others, no one industry sector is dominant within the province. In Manitoba, each sector is typically dominated by less than six customers, with the remaining customers being smaller with more specialized operations or substantively lower outputs. This diversity presents some unique challenges as opportunities to capture substantive savings are tied directly to specific industry business cycles within each industry sector that dictate major events such as equipment change-outs, plant overhauls, facility expansions, and new plant construction. These cycles are periodic and can stretch across decades.

Manitoba Hydro's industrial Power Smart programs must have broad appeal in order to be relevant and responsive to the needs of a diverse population of industrial customers.

Incentive Based Programs

Performance Optimization Program

The Performance Optimization Program was originally launched in June 1993 to promote energy efficiency through the optimization of electric motor-driven industrial systems such as air compressors, pumps, fans and blowers, optimization of industrial refrigeration, process heating, electro-chemical processes systems, and implementation of plant-wide energy management systems. The program is designed to provide industrial and large commercial customers with technical support and financial incentives to assist in the identification, investigation, and implementation of system efficiency improvements throughout a facility.

The target market consists of approximately 2 000 industrial customers, with the program being available to both existing facilities and new construction projects. Emphasis is placed on the 300 largest customers who represent about 1/3 of the energy consumed in Manitoba. The average duration of a project from identification of the opportunity to implementation ranges from 6 months to 2 years, averaging approximately 18 months.

The actual number of project applications facilitated in any fiscal year and the savings achieved per project can vary dramatically based on project size, equipment age, and remaining life of the individual systems being optimized. However, savings levels are relatively consistent, thereby reflecting the capability within Manitoba Hydro's programs to adapt to available opportunities. Targeted companies may have multiple eligible energy conservation projects that are captured in a short period of time, resulting in intense periods of activity in a company or industry sector followed by a lull in activity thereafter as investment is recouped and productivity gains are utilized.

	1993/94 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
Capacity Savings (MW)	99.9	2.7	5.8	9.4	**109.3**
Energy Savings (GW.h)	517.2	17.1	37.1	60.0	**577.2**
Utility Investment (Millions, 2014$)	$35.5	$5.9	$6.9	$7.9	**$56.2**
Customer Investment (Millions, 2014$)	$88.1	$0.7	$0.8	$0.9	**$90.5**
Total DSM Investment (Millions, 2014$)	$123.6	$6.6	$7.7	$8.9	**$146.7**
Estimated Average Annual Bill Reduction per Customer (Electric): $7,895					

**Includes estimates for 2013/14*

Natural Gas Optimization Program

The Natural Gas Optimization Program (NGOP) is a 12-year program that was launched in September 2006. Its primary objective is to support the systematic improvement of natural gas equipment and processes for industrial and large institutional customers. The program supports customers by offering financial incentives for steam trap audits, feasibility studies, and energy efficient project implementation. The program was principally developed to promote custom applications within large industrial, institutional, and commercial facilities comprised of roughly 1 400 customers in Manitoba. Since the launch of the program, it has become apparent that the small-to-medium industrial customers are also interested in pursuing energy efficiency with support from Manitoba Hydro. The scope of the NGOP has since been expanded to allow the program to respond to all industrial customer inquiries, regardless of the size of the facility or volume of natural gas consumed.

Like the Performance Optimization Program, the NGOP is a custom program that supports a variety of technologies across a wide variety of applications including boiler conversions, process water and air heat recovery, process equipment and pipe insulation, boiler economizers, and other available technologies. The program is designed to address key market barriers related to project costs, available benefits, cost/benefit ratios, and desired return on investment. Current low natural gas commodity prices are challenging Manitoba Hydro customers' desired rates of return on investment in conservation initiatives.

	2006/07 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
Natural Gas Savings (million m^3)	14.0	1.2	2.4	3.6	**17.6**
Utility Investment (Millions, 2014$)	$4.5	$0.6	$0.6	$0.6	**$6.2**
Customer Investment (Millions, 2014$)	$24.6	$2.0	$2.0	$2.0	**$30.7**
Total DSM Investment (Millions, 2014$)	$29.0	$2.6	$2.6	$2.6	**$36.9**
Estimated Average Annual Bill Reduction per Customer (Natural Gas): $22,247					

**Includes estimates for 2013/14*

Bioenergy Optimization Program

The Bioenergy Optimization Program was launched in 2008 to encourage customers to install, operate, and maintain customer-sited load displacement generation systems that employ combined heat and power (CHP) and renewable fuels, specifically biomass. The target market consists of customers that have readily available, low-cost sources of biomass, a continual need for heat and power, and the capability to operate and maintain biomass-to-energy conversion systems. A lack of proven demonstration projects of biomass-to-energy is a key barrier for many customers, considering the high initial costs for many of these systems. To increase awareness and knowledge of bioenergy opportunities, Manitoba Hydro has undertaken five demonstration projects over the past 3 years. Increased awareness combined with incentives are expected to increase customer interest and acceptance of bioenergy systems. Manitoba Hydro's program further supports customers in developing a thorough understanding of the costs and benefits of bioenergy systems, assisting with the development of strong business cases for future installations.

Major customer sectors targeted include industrial, Hutterite colonies, and livestock production. The size of these systems is anticipated to be smaller during the earlier stages of the program, primarily due to the high cost of the systems. Installations are anticipated to grow in size as comfort with these technologies matures. While initial projections for customer participation are relatively modest, opportunities for larger savings exist in larger industrial facilities with substantial waste streams and considerable need for combined heat and power systems to support their operations. Government policy on renewable energy is anticipated to be a factor in the future uptake of load displacement generation systems in Manitoba.

	2008/09 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
Capacity Savings (MW)	0.1	1.6	3.4	4.7	**4.8**
Energy Savings (GW.h)	0.1	14.3	29.5	41.1	**41.2**
Natural Gas Savings (million m^3)	0.0	0.0	0.7	0.9	**0.9**
Utility Investment (Millions, 2014$)	$11.2	$2.1	$2.7	$1.8	**$17.8**
Customer Investment (Millions, 2014$)	$27.1	$2.4	$3.5	$2.4	**$35.3**
Total DSM Investment (Millions, 2014$)	$38.3	$4.4	$6.2	$4.2	**$53.1**
Estimated Average Annual Bill Reduction per Customer (Electric): $81,687					
Estimated Average Annual Bill Reduction per Customer (Natural Gas): $26,946					

**Includes estimates for 2013/14*

Customer-Sited Load Displacement

The Customer-Sited Load Displacement Program encourages customers to install, operate, and maintain customer-sited load displacement generation systems that employ combined heat and power (CHP) and rely on the use of waste streams and by-products, locally available, low cost sources of biomass fuel, and other renewable energy sources. The target market consists of several large-sized customers or customer sectors that are striving to optimize their operations and improve environmental performance.

Waste streams and by-products from manufacturing operations typically present a cost of disposal and an environmental liability to the manufacturer. Being able to convert waste streams and by-products into useful energy for the manufacturing operation is potentially a more sustainable practice and a means to reduce energy and disposal costs. Similarly, locally available low cost sources of biomass such as waste wood and crop residues can be harnessed as a sustainable and economic fuel source for on-site heat and power generation applications. Other emerging energy sources such as wind and solar may have potential in certain instances to offset purchased energy. Manitoba Hydro's new Customer-Sited Load Displacement Program offers technical and financial support to understand the feasibility to use these types of fuel sources, to implement the equipment and systems for load displacement generation, and to ensure ongoing, reliable operation of the energy production equipment.

Major customer sectors targeted by the program include forestry, chemicals, metals, oil and gas, and wastewater treatment. The size of these systems is anticipated to range from 1 MW to 15 MW of electrical load displacement via on-site generation. Installations are anticipated to cost between $3,500 to $5,000 per kW electric installed. Customer costs will be dependent upon existing infrastructure and operational capability.

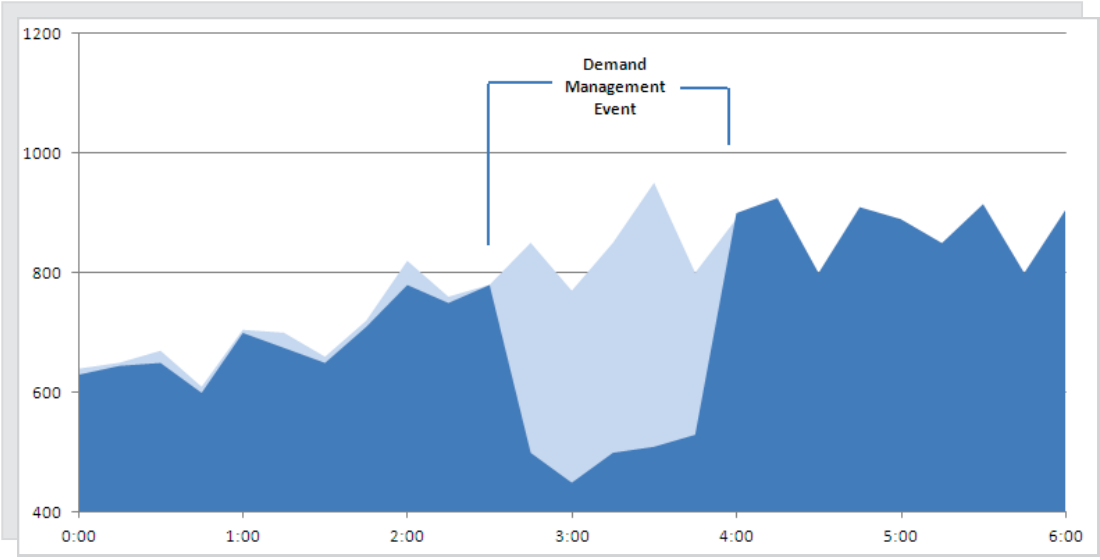
	2014/15	2015/16	2016/17	Total to 2016/17
No. of Customers (annual)	11	14	7	**32**
Capacity Savings (MW)	24.1	37.6	56.0	**56.0**
Energy Savings (GW.h)	137.5	191.0	335.6	**335.6**
Utility Investment (Millions, 2014$)	$1.6	$5.2	$21.4	**$28.1**
Customer Investment (Millions, 2014$)	$7.8	$17.5	$44.9	**$70.1**
Total DSM Investment (Millions, 2014$)	$9.4	$22.7	$66.3	**$98.3**
Estimated Average Annual Bill Reduction per Customer (Electric): Variable depending on project size				

Curtailable Rate Program

Under the Curtailable Rate Program, qualifying customers receive a monthly credit on load (kW) that can be curtailed on notice from Manitoba Hydro. To be eligible, customers' load/processes must be configured to allow them to meet the requested curtailment within the notification period as outlined under their chosen contract option.

	1990/00 to 2013/14*	2014/15	2015/16	2016/17	Total to 2016/17
No. of Customers (annual)	49	3	3	3	**58**
Capacity Savings (MW)	160.4	160.9	160.9	160.9	**160.9**
Utility Investment (Millions, 2014$)	$94.0	$6.0	$6.0	$6.0	**$111.9**

**Includes estimates for 2013/14*



CAC/MH I-17

Reference: Board Order 43/13, pages 14 - 15

Please explain the cost containment measures implemented or planned, and quantify the anticipated savings therefrom.

ANSWER:

Please see Manitoba Hydro's response to PUB/MH I-30(d).

CAC/MH I-18

Reference: Application, Section 1.0 Summary of Application, page 2 (lines 2 - 4)

Please indicate what % rate increase would be required to generate an additional $1 – 2M over approved rates.

ANSWER:

A rate increase of 0.11% would be required to generate an additional $1.5M over approved rates in 2015.

A rate increase of 0.11% in 2014/15 would require future rate increases above 4% to preserve Manitoba Hydro's financial integrity to adequately address risks and to promote rate stability for customers.

CAC/MH I-19

Reference: Application, Section 3.0 Reasons for Application, page 4 (lines 20 - 23)

Given that 2013/14 is forecast to be a favourable year, and that MH's long term forecast projects a need for annual rate increases of 3.95%, please explain why it is considered necessary to proceed by way of an interim rate application, rather than simply filing a GRA.

ANSWER:

The projected rate increases in Manitoba Hydro's financial forecast are based on average water flows and normal weather. To ensure rate stability for customers, it is necessary to implement regular and reasonable rate increases, even during periods of favourable water flows and colder than normal weather, in order to balance the inevitable years where water flows are below average and weather is warmer than normal.

If Manitoba Hydro did not proceed with the filing of this Interim Application at this time, and instead waited to file a full GRA in the fall of 2014, the earliest anticipated implementation of any rate increase would be the summer of 2015. From a financial perspective this is not acceptable. Manitoba Hydro's long-term forecast reinforces the need to implement the requested rate increase in its entirety because without regular and reasonable rate increases, there exists potential for significantly higher rate increases in the future than those projected in MH13.

Without the proposed rate increase, Manitoba Hydro is forecasting a loss on Electric operations of $1 million in the 2014/15 fiscal year and its key financial ratios would be significantly below corporate targets. Manitoba Hydro is seeking interim rate relief in this Application rather than filing a General Rate Application at this time, in order to avoid

resource and scheduling constraints during the Needs For and Alternatives To ("NFAT") proceeding with respect to Manitoba Hydro's Preferred Development Plan and to ensure timely implementation of the proposed rate increase. Manitoba Hydro will seek final approval of any rate increase flowing from this Application at its next General Rate Application, at which time all interested parties will have the opportunity to further test the need for the requested rate increase.

CAC/MH I-20

Reference: Application, Section 5.2 Financial Targets, page 16

a) Please indicate whether IFF12 anticipated the proposed rate increase.

ANSWER:

Yes, as indicated on page one of IFF12 "….it is projected that rate increases of 3.95% will be required in each of the remaining 18 years of the 20-year forecast."

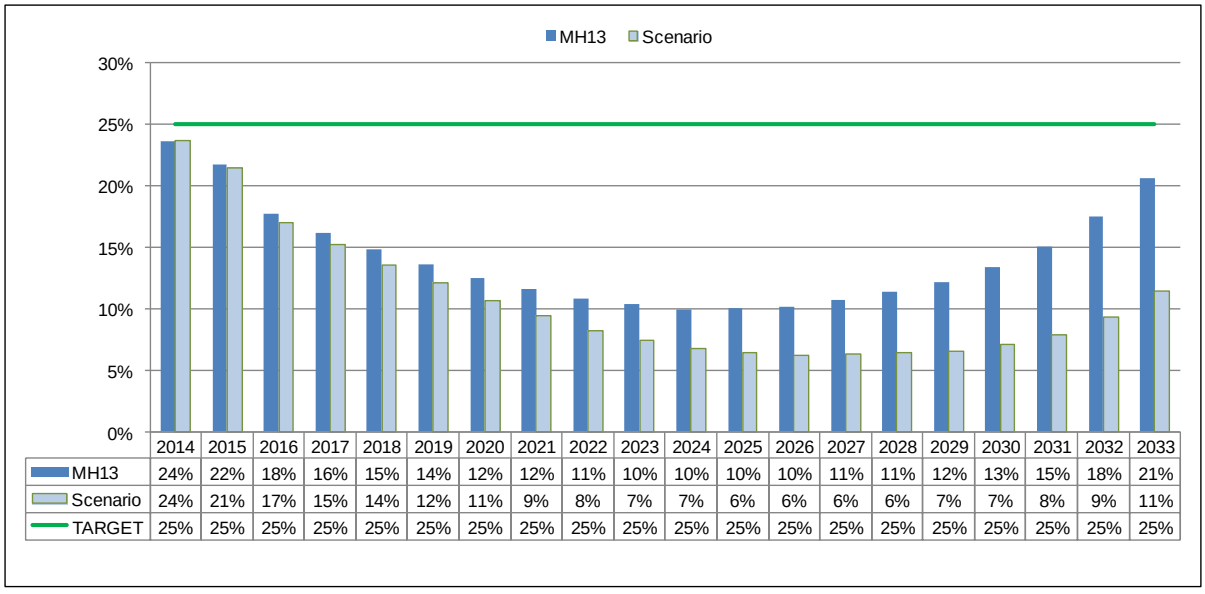
CAC/MH I-20

Reference: Application, Section 5.2 Financial Targets, page 16

b) What would the projected equity ratio be without the proposed interim rate increase?

ANSWER:

As can be seen in the following graph, without the proposed interim rate increase Manitoba Hydro's projected equity ratio would further deteriorate from a low-point of 10% as forecast in IFF13 to 6%.



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
MH13	24%	22%	18%	16%	15%	14%	12%	12%	11%	10%	10%	10%	10%	11%	11%	12%	13%	15%	18%	21%
Scenario	24%	21%	17%	15%	14%	12%	11%	9%	8%	7%	7%	6%	6%	6%	6%	7%	7%	8%	9%	11%
TARGET	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%

CAC/MH I-20

Reference: Application, Section 5.2 Financial Targets, page 16

c) What would the projected equity ratio be if the proposed rate increase was implemented in October, 2014?

ANSWER:

Deferring the implementation of the 3.95% rate increase to October 2014 would decrease the 2014/15 net income by $24 million and over time reduces the 2032/33 retained earnings by $82 million.

Deferring the implementation of the 3.95% rate increase to January 2015 would decrease the 2014/15 net income by $38 million and over time reduces the 2032/33 retained earnings by $102 million.

These reductions in net income do not materially impact the projected equity ratio over the forecast period; however there is continuous negative impact to finance expense as a result of the 2014/15 net income reduction, which may require Manitoba Hydro to seek higher rate increases in the future than the 3.95% projected in MH13.

CAC/MH I-20

Reference: Application, Section 5.2 Financial Targets, page 16

d) What would the projected equity ratio be if the proposed rate increase was implemented in January, 2015?

ANSWER:

Please see Manitoba Hydro's response to CAC/MH I-20(c).