

**CAC-GAC/MH II-1**

**Subject: Annual Savings**

**Reference: 2011 Power Smart Plan, Appendix 7.1 (Appendix A.3); and CAC-GAC/MH I-1c**

**Preamble: In round 1, question I-1c, we asked Manitoba Hydro to provide a detailed breakdown of the non-recurring savings due to the end of measure lives (EULs) for each measure and program. Manitoba Hydro declined, indicating that the requested information would require a substantial effort to compile.**

**a) Please provide the requested information at sector (residential, CI, industrial) level only. If this is still too onerous for Manitoba Hydro, present it at least at the fully aggregated DSM Plan level.**

**ANSWER:**

Manitoba Hydro's Power Smart Plan is created using a bottom-up approach. Thus, in order to provide a sector-based or aggregate analysis of the non-recurring savings due to the end of measure lives, the individual measure and program analysis would need to be performed. As indicated in CAC/GAC/MH I-1(c), this would require a substantive effort to compile due to the large volume of measures within programs with varying estimated EULs for each measure.

**CAC-GAC/MH II-2**

**Subject: Codes and standards**

**Reference: Reference: 2011 Power Smart Plan, Appendix 7.1**

**Preamble: In other regions, DSM plans increasingly include programs aimed at strengthening compliance with (and/or enforcement of) new or existing codes and standards.**

- a) Please indicate what if any effort, both descriptive and in budgetary terms, Manitoba Hydro plans on investing to maximize compliance with codes and standards once they are adopted.**

**ANSWER:**

Responsibility for compliance and enforcement of codes in Manitoba resides with the Manitoba Department of Labour and its special operating agency, the Office of the Fire Commissioner (OFC). Manitoba Hydro works collaboratively with the OFC to review and provide input for code development including identifying where Manitoba Hydro expertise can assist with training for both code officials and the industry. Manitoba Hydro's efforts also support the planned changes in advance of codes being adopted by assisting with preparing both industry and customers. By building market experience with the proposed changes, the probability of acceptance of the future energy codes is improved, maximizing future compliance. All costs associated with Manitoba Hydro's efforts on this front are not specifically tracked and are allocated against general Power Smart budgets.

**CAC-GAC/MH II-2**

**Subject: Codes and standards**

**Reference: Reference: 2011 Power Smart Plan, Appendix 7.1**

**Preamble: In other regions, DSM plans increasingly include programs aimed at strengthening compliance with (and/or enforcement of) new or existing codes and standards.**

**b) Please indicate where costs for and savings from such code compliance/enforcement efforts fall under Manitoba Hydro's current classification: "Conservation" or "Codes, Standards & Regulation"?**

**ANSWER:**

As outlined in Manitoba Hydro's response to CAC/GAC/MH II-2(a), Manitoba Hydro's efforts focus on building industry and customer experience with the proposed code changes prior to code introduction in order to improve the probability of acceptance thereby maximizing future compliance. As such, the cost of such program activity falls under the respective program budgets. The predicted savings as a result of a future code being fully implemented in the market are accounted for within the program metrics. Once enacted or in force in Manitoba or at a National level, code savings are moved to be reported under "Codes, Standards & Regulations".

**CAC-GAC/MH II-3**

**Subject: Sales by sector and end-use**

**Reference: 2011 Power Smart Plan, Appendix 7.1; and Electric load Forecast, Appendix 8.1**

- a) Please provide sales (GWh at meter) for year 2011 (or most recent year if 2011 data is not available) by sector: “residential”, “commercial”, “industrial”, and “other” (if any).

**ANSWER:**

<b>2010/11 Actual Sales</b>	
<b>Sector</b>	<b>GW.h</b>
Residential	6,952
Commercial	6,005
Industrial	7,576
Other	253
<b>Total</b>	<b>20,786</b>

**CAC-GAC/MH II-3**

**Subject: Sales by sector and end-use**

**Reference: 2011 Power Smart Plan, Appendix 7.1; and Electric load Forecast, Appendix 8.1**

- b) Please provide sales (GWh at meter) for year 2011 (or most recent year if 2011 data is not available) by key end-uses: space heating, cooling, domestic hot water, plug load, lighting, industrial processes, etc.**

**ANSWER:**

Sales data by end-use is not available as Manitoba Hydro's customer metering does not record consumption by end-use.

**CAC-GAC/MH II-4**

**Subject: Heating Loads**

**Reference: 2011 Power Smart Plan, Appendix 7.1; and CAC-GAC I-11**

- a) **Energy Sources: Please provide a breakdown of the electric and non-electric space heating market shares in Manitoba. Please distinguish between (i) residential and commercial/institutional sectors, and (ii) existing and new homes/buildings.**

**ANSWER:**

**MANITOBA HYDRO TOTAL RESIDENTIAL SECTOR \***

	TOTAL RESIDENTIAL		ELECTRIC HEAT		NON-ELECTRIC HEAT	
	# OF UNITS	% OF UNITS	# OF UNITS	% OF UNITS	# OF UNITS	% OF UNITS
NEW CONSTRUCTION (2005-2009)	22,002	5.0%	13,750	62.5%	8,252	37.5%
EXISTING DWELLINGS (PRE 2005)	417,094	95.0%	143,689	34.5%	273,404	65.5%
<b>TOTAL</b>	<b>439,096</b>	<b>100.0%</b>	<b>157,439</b>	<b>35.9%</b>	<b>281,656</b>	<b>64.1%</b>

\* Source: 2009 Manitoba Hydro Residential Energy Use Survey

Electric versus non-electric space heating information is not available for the commercial/industrial sectors.

**CAC-GAC/MH II-4****Subject: Heating Loads****Reference: 2011 Power Smart Plan, Appendix 7.1; and CAC-GAC I-11**

- b) **Heating Systems (Existing):** Please provide a breakdown of heating system market shares within the residential and small commercial sectors, using the following table. Should Manitoba Hydro not have all of the requested information, please provide whatever quantitative information it does have.

	TOTAL		ZONED ELECTRIC				CENTRAL ELECTRIC				NON-ELECTRIC
			Baseboard		Ductless Heat Pump		Central Heat Pump		Furnace / Boiler		
	# of units	GWh	% of units	% of GWh	% of units	% of GWh	% of units	% of GWh	% of units	% of GWh	% of units
Single Family											
Small MF (2-4 units)*											
Mid/large MF (5+)*											
Small CI (define size)*											
TOTAL											

\* Suggested size classifications. Use and indicate Manitoba Hydro's preferred size classification if different.

**ANSWER:**

Please see the following table for the residential sector. Heating system breakdowns are not available for the commercial/industrial sectors.

# 2012/13 & 2013/14 Electric General Rate Application

## MANITOBA HYDRO TOTAL RESIDENTIAL SECTOR \*

	TOTAL RESIDENTIAL		ELECTRIC BASEBOARD		ELECTRIC HEAT PUMP		ELEC FURNACE/BOILER		NON-ELECTRIC HEAT	
	WEATHER ADJ		WEATHER ADJ		WEATHER ADJ		WEATHER ADJ		WEATHER ADJ	
	# OF UNITS	# OF GW.h	% OF UNITS	% OF GW.h	% OF UNITS	% OF GW.h	% OF UNITS	% OF GW.h	% OF UNITS	% OF GW.h
SINGLE FAMILY	349,899	6,199.7	10.2%	14.2%	2.0%	3.2%	23.9%	40.8%	63.8%	41.7%
MULTI FAMILY	33,324	341.1	16.5%	23.1%	0.3%	0.7%	8.7%	16.9%	74.5%	59.3%
APARTMENT SUITES	55,873	337.4	33.3%	46.9%	0.0%	0.0%	6.8%	11.2%	59.9%	41.9%
<b>TOTAL</b>	<b>439,096</b>	<b>6,878.2</b>	<b>13.6%</b>	<b>16.3%</b>	<b>1.6%</b>	<b>3.0%</b>	<b>20.6%</b>	<b>38.2%</b>	<b>64.1%</b>	<b>42.6%</b>

\* Source: 2009 Manitoba Hydro Residential Energy Use Survey



**CAC-GAC/MH II-4****Subject: Heating Loads****Reference: 2011 Power Smart Plan, Appendix 7.1; and CAC-GAC I-11**

- c) **Heating Systems (New):** Please provide the same information as in the table above, but for new heating system choices. By new heating system choices we refer to the systems customers (or builders) install either at replacement (e.g. replacement of an existing furnace, whether electric or not), or in new construction. In the “total” column, for the # of units, please provide annual numbers.

**ANSWER:**

Please see the following table for the residential sector. Heating system breakdowns are not available for the commercial/industrial sectors.

MANITOBA HYDRO RESIDENTIAL NEW HEATING SYSTEMS INSTALLED ANNUALLY\*

	NEWLY INSTALLED TOTAL		ELECTRIC BASEBOARD		ELECTRIC HEAT PUMP		ELEC FURNACE/BOILER		NON-ELECTRIC HEAT	
	WEATHER ADJ		WEATHER ADJ		WEATHER ADJ		WEATHER ADJ		WEATHER ADJ	
	# OF UNITS	GW.h	# OF UNITS	GW.h	# OF UNITS	GW.h	# OF UNITS	GW.h	# OF UNITS	GW.h
SINGLE FAMILY	19,096	322	3.8%	5.2%	3.6%	6.6%	22.1%	39.6%	70.5%	48.6%
MULTI FAMILY	1,822	18	7.8%	8.3%	0.0%	0.0%	12.1%	23.7%	80.1%	68.0%
APARTMENT SUITES	1,714	13	27.1%	26.1%	0.0%	0.0%	30.5%	43.7%	42.4%	30.2%
<b>TOTAL</b>	<b>22,632</b>	<b>353</b>	<b>5.9%</b>	<b>6.1%</b>	<b>3.0%</b>	<b>6.0%</b>	<b>21.9%</b>	<b>39.0%</b>	<b>69.2%</b>	<b>48.9%</b>

\* Source: 2009 Manitoba Hydro Residential Energy Use Survey

**CAC-GAC/MH II-5****Subject: Previous DSM Plans forecasts****Reference: 2011 Power Smart Plan, Appendix 7.1 (Appendix A.3)**

- a) Please provide projected annual energy savings (GWh at meter), both for “Conservation” and for the Overall Plan, for each DSM Plan or Plan Update released from 2000 to 2011. For example:

**CONSERVATION ONLY**

	2000	2001	2002	2003	2004	2005	2006	(Cont'd) .....	Last yr of plan
<b>2000 Plan</b>	xx	xx	xx	xx	xx	xx	xx	...	xx
<b>2001 Plan</b>		xx	xx	xx	xx	xx	xx	...	xx
<b>2002 Plan</b>			xx	xx	xx	xx	xx	...	xx
<b>2003 Plan</b>				xx	xx	xx	xx	...	xx
<i>(Continued to most recent plan)</i> .....									

**ANSWER:**

The following tables outline the projected energy savings (GWh at meter).

**CONSERVATION ONLY**

	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
2007 Plan	84	189	276	356	430	495	550	603	654	708	756	-	-	-	-	-	-	-	-
2008 Plan	-	117	223	322	411	496	555	604	654	709	774	814	847	881	915	947	962	-	-
2009 Plan	-	-	150	317	460	544	618	630	640	658	712	766	806	845	885	914	947	954	-
2010 Plan	-	-	-	104	232	333	433	527	601	665	725	762	780	806	838	866	884	898	-
2011 Plan	-	-	-	-	93	176	264	341	414	485	550	614	660	707	732	761	785	807	820

**OVERALL PLAN**

	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
2007 Plan	226	372	500	637	771	907	1,051	1,178	1,303	1,429	1,446	-	-	-	-	-	-	-	-
2008 Plan	-	277	303	448	592	735	844	949	1,045	1,141	1,247	1,328	1,398	1,468	1,537	1,605	1,654	-	-
2009 Plan	-	-	276	496	695	847	990	1,062	1,073	1,146	1,252	1,357	1,444	1,529	1,615	1,688	1,764	1,813	-
2010 Plan	-	-	-	229	414	607	800	999	1,211	1,265	1,378	1,467	1,537	1,611	1,689	1,762	1,824	1,882	-
2011 Plan	-	-	-	-	214	365	523	689	858	1,022	1,136	1,245	1,336	1,423	1,489	1,556	1,616	1,673	1,716

**CAC-GAC/MH II-6**

**Subject: Programs retired from the 2011 Plan**

**Reference: 2011 Power Smart Plan, Appendix 7.1; 2010-2011 Power Smart Annual Review, Appendix 7.2; and GAC/MH I-9**

**Preamble: Manitoba Hydro identifies two programs, Power Smart Shops and Power Smart Energy Manager, that were included in previous Power Smart Plans but not in the 2011 Power Smart Plan.**

**a) What were the potential GWh savings associated with each of these two programs?**

**ANSWER:**

The 2010 Power Smart Plan forecast energy savings of 1.7 GWh and 1.0 GWh in year 2024/25 for Power Smart Shops and Power Smart Energy Manager respectively.

**CAC-GAC/MH II-6**

**Subject: Programs retired from the 2011 Plan**

**Reference: 2011 Power Smart Plan, Appendix 7.1; 2010-2011 Power Smart Annual Review, Appendix 7.2; and GAC/MH I-9**

**Preamble: Manitoba Hydro identifies two programs, Power Smart Shops and Power Smart Energy Manager, that were included in previous Power Smart Plans but not in the 2011 Power Smart Plan.**

**b) Does the Power Smart savings forecast account for the possibility of “alternative approaches” that Hydro has indicated it is exploring in order to secure all or part of this potential?**

**ANSWER:**

The savings forecast in the 2011 Power Smart Plan does not include those associated with alternative approaches to the Power Smart Shops and Power Smart Energy Manager programs. Cost effective alternative approaches continue to be investigated, screened and reviewed.

**CAC-GAC/MH II-7**

**Subject: Future DSM efforts**

**Reference: 2011 Power Smart Plan, Appendix 7.1; 2010-2011 Power Smart Annual Review, Appendix 7.2; and GAC/MH I-9 (referring to RCM/TREE/MH I-10(e) of the 2010/11 & 2011/12 Electric General Rate Application)**

- a) **Please update the information provided in RCM/TREE/MH I-10(e) of the 2010/11 & 2011/12 Electric General Rate Application or, in the alternative, confirm that the information it contains is still up-to-date today.**

**ANSWER:**

Please see details below for the targeted market penetration for various programs reviewed in the 2011 Power Smart Plan.

**New Home Program** – Market penetration is expected to be 8% by the year 2012, the scheduled end date for the program. This estimate is based on historical and projected program participation rates [No change from RCM/TREE/MH I-10(e).]

**Home Insulation Program** – Market penetration is expected to be 60% by the year 2017, the scheduled end date for the program. This estimate is based on historical and projected program participation rates.

**Water & Energy Saver Package** – Market penetration is expected to be 25% by the year 2015, the scheduled end date for the program. This estimate is based on predicted market acceptance of water saving technologies as well participation results from other utilities offering similar programs [No change from RCM/TREE/MH I-10(e).]

**Lower Income Energy Efficiency Program (LIEEP)** — Market penetration among electrically heated homes is expected to be approximately 10% by the end of March 2017. The total participation is estimated to be 3,300 by March 2017, and the potential market size is estimated to be approximately 31,500 lower income (LICO x 125%) dwellings based on the residential study of 2009 and estimated First Nations market potential.

**Refrigerator Recycling** – Market penetration is expected to be 20% by the end of 2013, the scheduled end of the 3-year program. This estimate is based on participation rates for similar programs offered by other utilities. [No change from RCM/TREE/MH I-10(e).]

**Commercial Lighting Program** – Market penetration is expected to be 61% by the year 2025. This estimate is based on historical and projected customer participation.

**Commercial Custom Measures Program** – This program is used to support any and all energy saving upgrades not addressed by the existing suite of programs. It serves as a catch-all for sometimes unique and unknown upgrades. As such, it is very difficult to define the overall market and market penetration [No change from RCM/TREE/MH/I-10(e)]

**Commercial Windows Program** – Market penetration is expected to be 28% by the year 2025. This estimate is based on historical and projected customer participation.

**Commercial HVAC Program (Chiller)** – Market penetration is expected to be 53% by the scheduled program end date of 2017. This estimate is based on historical and projected customer participation.

**Commercial Refrigeration Program** – Market penetration is expected to be 52% by the scheduled program end date of 2024. This estimate is based on historical and projected customer participation.

**Commercial Insulation Program** – Market penetration is expected to be 39% by the year 2025. This estimate is based on historical and projected customer participation.

**Commercial Earth Power Program** – Market penetration is expected to be 15% by the year 2016. This estimate is based on historical and projected customer participation.

**Commercial New Construction Program** – Market penetration is expected to be 21% by the scheduled program end date of 2018. [No change from RCM/TREE/MH I-10(e).]

**Commercial Building Optimization Program** – Market penetration is expected to be 34% by the year 2025. This estimate is based on historical and projected customer participation.

**Commercial Kitchen Appliance Program** – Market penetration is expected to be 48% by the scheduled program end date of 2017. This estimate is based on historical and projected customer participation.

**Commercial Clothes Washers Program** – Market penetration is expected to be 38% by the year 2016. This estimate is based on historical and projected customer participation.

**Network Energy Management Program** – Market penetration is expected to be 10% by the scheduled program end date of 2013. This estimate is based on historical and projected customer participation.

**CO2 Sensors** – Market penetration is expected to be 24% by the scheduled program end date of 2018. This estimate is based on historical and projected customer participation.

**Performance Optimization Program** – Market penetration is expected to be 18% by the program end date of 2018 and was based on the economic opportunities related to mechanical processes in industrial and large commercial customers. [No change from RCM/TREE/MH I-10(e).]

**Emergency Preparedness Program** – The Emergency Preparedness Program plan is targeting a penetration rate of 70% for its program period. This is based on a target consisting of the top 250 electric customers in greater Winnipeg. [No change from RCM/TREE/MH I-10(e).]



**CAC-GAC/MH II-7**

**Subject: Future DSM efforts**

**Reference: 2011 Power Smart Plan, Appendix 7.1; 2010-2011 Power Smart Annual Review, Appendix 7.2; and GAC/MH I-9 (referring to RCM/TREE/MH I-10(e) of the 2010/11 & 2011/12 Electric General Rate Application)**

- b) Does the current PowerSmart savings forecast account for any follow-up to the CFL program scheduled to end in 2012, for example to promote CFLs and LEDs post-2012? If not, why?**

**ANSWER:**

The 2011 Power Smart Plan does not claim for savings associated with the promotion of CFLs or LEDs. CFLs are deemed to have been transformed in the Manitoba market and the performance level will be a regulated standard nationally by 2014.

The LED technology is being monitored for improvements in illuminating performance which has been the primary adoption barrier to date in combination with the very high capital cost. Although LEDs do use less energy than the current standard which is largely CFLs, the current value of energy savings does not warrant pursuit of these opportunities in the short term and they will therefore be reassessed on an annual basis.

**CAC-GAC/MH II-7**

**Subject: Future DSM efforts**

**Reference: 2011 Power Smart Plan, Appendix 7.1; 2010-2011 Power Smart Annual Review, Appendix 7.2; and GAC/MH I-9 (referring to RCM/TREE/MH I-10(e) of the 2010/11 & 2011/12 Electric General Rate Application)**

- c) Does the current PowerSmart savings forecast account for any effort to specifically promote ductless heat pumps? If not, why?**

**ANSWER:**

The 2011 Power Smart Plan does not include savings related to the promotion of ductless (air source) heat pumps. In the commercial market, these systems are also known as Variable Refrigerant Flow systems (VRF). Manitoba Hydro is aware of the technology. As with all air source heat pump technologies, Manitoba's cold climate hampers its energy performance and efficiency which makes the technology economically unattractive or marginal at best, particularly in areas where the technology would be displacing natural gas use.

These systems have high capital costs, are relatively technically complex, and have significant risks of high maintenance and repair costs for customers, given the severe operating conditions during Manitoba's winters.

A ductless heat pump system is currently being installed in Manitoba Hydro's Gilliam office as to test performance and reliability in Manitoba's market.

**CAC-GAC/MH II-7**

**Subject: Future DSM efforts**

**Reference: 2011 Power Smart Plan, Appendix 7.1; 2010-2011 Power Smart Annual Review, Appendix 7.2; and GAC/MH I-9 (referring to RCM/TREE/MH I-10(e) of the 2010/11 & 2011/12 Electric General Rate Application)**

- d) Does the current PowerSmart savings forecast account for any effort to promote other alternative heating and/or cooling appliances (e.g. geothermal, solar hot water, wood pellets, etc.)? If not, why?**

**ANSWER:**

Energy savings from geothermal heat pump systems are currently forecast in the 2011 Power Smart Plan.

Solar water heating (SWH) does not have energy savings forecast in 2011 Power Smart Plan. Manitoba Hydro offered an incentive based program for solar water heating in 2008 to 2010 in partnership with Natural Resources Canada. Customer participation was much lower than expected in Manitoba as well as in Canada overall. The program highlighted that even with a generous incentive, the capital cost of installing SWH was still a major market barrier that deterred customers from adopting this technology. Manitoba Hydro continues to support this technology by allowing the technology to be financed through the Residential Earth Power Loan program.

Outside of Manitoba Hydro's Bioenergy Program as outlined in Manitoba Hydro's response to MIPUG/MH I-7(d), biomass including wood pellets does not have energy savings forecast in the 2011 Power Smart Plan. Manitoba Hydro continues to monitor the technology for future opportunities.