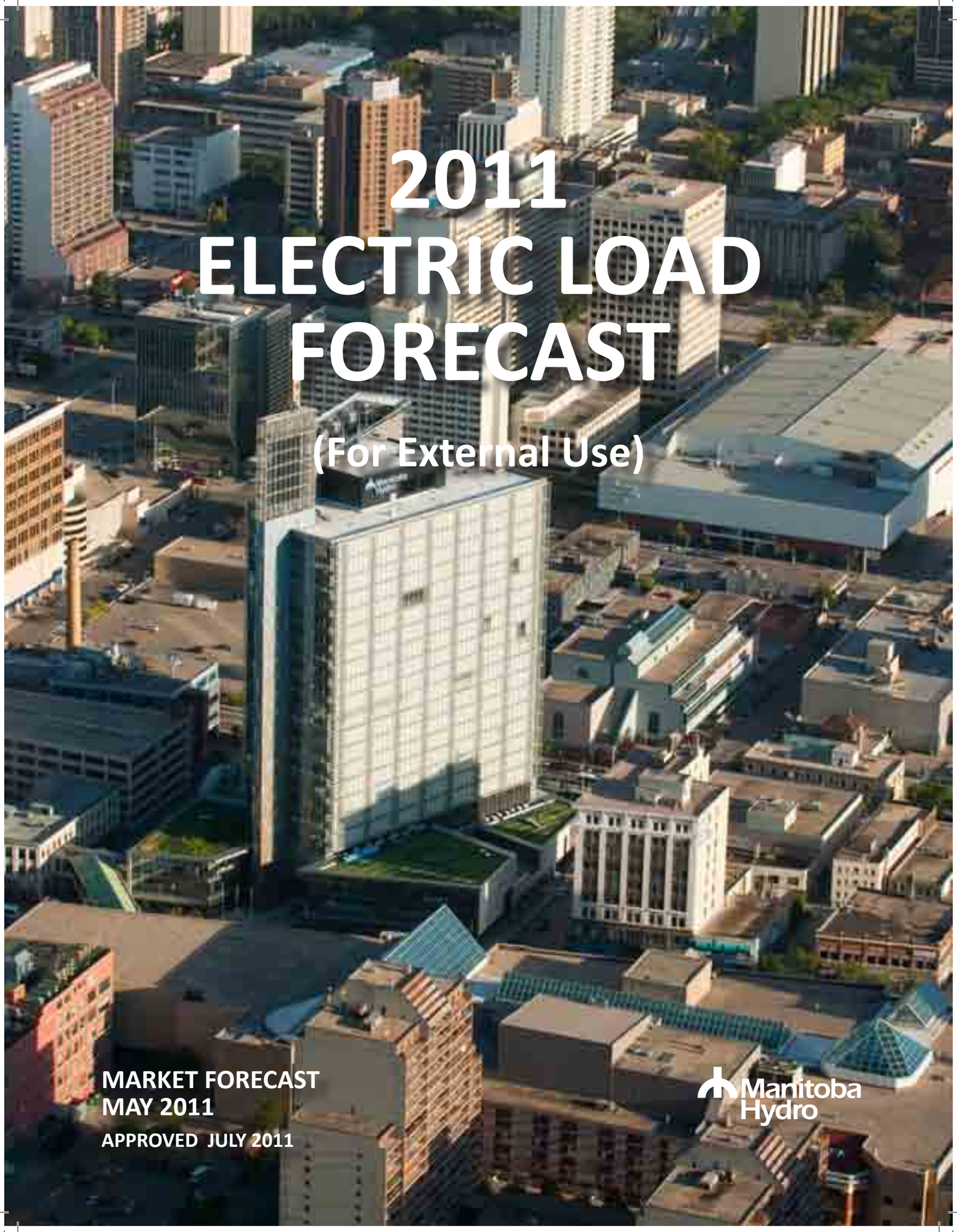

2011 ELECTRIC LOAD FORECAST

(For External Use)

MARKET FORECAST
MAY 2011

APPROVED JULY 2011

Manitoba Hydro

Revised May, 2012

Cover Image: Aerial view of Manitoba Hydro Head Office
Photography by danharperphotography.com

EXECUTIVE SUMMARY

Overview

In 2010/11, Manitoba Hydro had 534,827 General Consumers Sales customers who used 20,786 GW.h. General Consumers Sales are divided into three sectors:

(1) Residential, with 467,382 customers who used 7,060 GW.h.
(2) General Service, with 66,261 customers who used 13,624 GW.h, and
(3) Area and Roadway Lighting, with 1,184 customers who used 103 GW.h.

Gross Firm Energy was 23,892 GW.h in 2010/11. Gross Total Peak for 2010/11 was 4,286 MW.

Gross Firm Energy is forecast to grow to 32,608 GW.h by 2030/31 at an average growth of 432 GW.h or 1.6% per year. Gross Total Peak is forecast to grow to 6,081 MW by 2030/31 at an average growth of 80 MW or 1.5% per year.

Forecast Details

The Residential sector is forecast to increase from a weather adjusted value of 7,145 GW.h in 2010/11 to 9,533 GW.h by 2030/31 at an average growth of 119 GW.h or 1.5% per year.

General Service Mass Market is forecast to increase from a weather adjusted value of 8,304 GW.h in 2010/11 to 11,308 GW.h by 2030/31. This represents an average growth of 150 GW.h or 1.6% per year.

General Service Top Consumers are forecast individually. The sum of the individual company consumption is 5,324 GW.h in 2010/11 and grows to 5,851 GW.h within ten years. This is a growth of 527 GW.h despite the expected major load decrease by 2015 for one customer.

Potential Large Industrial Loads are forecast to be 100 GW.h per year. Since 1987, there have been 10 major increases of load of 50 GW.h or more, and 3 major losses of load of 50 GW.h or more to General Service Top Consumers. The net effect has been an addition of 69 GW.h per year. Normal company growth has added another 23 GW.h per year. The combined effect is that GS Top Consumers has grown from 3,104 GW.h in 1987 to 5,324 GW.h in 2011, a growth of 92 GW.h or 2.3% per year. Including Potential Large Industrial Loads, GS Top Consumers is forecast to grow to 7,551 GW.h in 2030/31, for an average growth of 111 GW.h or 1.8% per year.

Electric Vehicles

The Plug-In Electric Vehicle (PEV) forecast for 2030/31 has been reduced from 195 GW.h in the 2010 forecast to 110 GW.h in this year's forecast. They would use 14 MW at winter peak.

Comparison to the 2010 Forecast

The Gross Firm Energy starts off down 124 GW.h in 2011/12 but is up the next three years. It is again down for the next five years due to the expected drop of load from a Top Consumer. By 2030/31 it is up 331 GW.h from the 2010 forecast. This is equivalent to 3/4 of a year of load growth (1 year = 432 GW.h).

Changes observed in the 2011 Forecast over the 2010 Forecast (and the 2030/31 effect):

1. Residential Basic forecast (+263 GW.h)
2. General Service Mass Market forecast (+705 GW.h)
3. General Service Top Consumers forecast (-613 GW.h)
4. Other Sales and Losses (-24 GW.h)

The Gross Total Peak starts down 47 MW in 2011/12 and remains down for the next four years. After that, the forecast is up and by 2030/31 is 129 MW higher than the 2010 forecast. This is equivalent to over 1 1/2 years of peak load growth (1 year = 80 MW).

Unexpected Potential Loads

These events are not expected within the next 20 years. They are listed so their effects can be considered if the need arises.

	Effect (GW.h)	Effect (MW)
Converting Diesel Customers to the Integrated System	+40	+9
Climate Change per Degree Celsius Warmer	+100	-40
2 Modest Size Server Farms	+200	+24
One New Very Large Industrial Customer	+1,500	+180
One Less Very Large Industrial Customer	-1,500	-180
Additional Load if Electric Vehicles Grow to 70%	+1,610	+201
Increased Residential Use of Electricity for Space heat	+814	+265
Increased Residential Use of Electricity for Water heat	+393	+45

A probability-based estimate that includes variation due to economics and all scenarios for 2030/31 gives a 10% chance that the Gross Energy requirement is greater than 35,394 GW.h and a 10% chance that it is less than 29,537 GW.h. The variation is plus or minus 2,929 GW.h.

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INTRODUCTION

This document is prepared annually as Manitoba Hydro's forecast of its future load requirements for its service area. The service area consists of all of Manitoba (99.83% of sales), as well as two resale customers that supply energy to Creighton, Sask. (0.14% of sales) and the Northwest Angle, Minn. (0.03% of sales). Exports of power to other utilities are not included.

This information is provided for several purposes. Rate making and accounting require forecasts of sales by billing month within rate groups, so they can forecast revenue. Operations and power planning require forecasts of energy and peak by calendar month, so they can determine supply requirements.

The word "customer" is used in this document to refer to a person, business or company that uses Manitoba Hydro's services. However, the "number of customers" provided is a count of the number of services that have specific rate codes. A house or a business often has just one electrical service and usually counts as one customer. But it sometimes can have multiple electric services and may count as more than one customer.

Electric consumption is read from a customer's meter in units of kilowatt-hours (kW.h). A typical home not using electricity for heating might use 10,000 kW.h per year. This document reports electric use in terms of gigawatt-hours (GW.h). One GW.h equals one million kW.h, which is approximately the energy of 100 typical homes not using electricity for heating.

Operations and power planning also require an estimate of the maximum load that will be required at any time during the year, so they can ensure they have that generation capacity available. The highest load requirement for a time period is known as the peak load. It is given in terms of megawatts (MW). One MW equals one thousand kilowatts (kW). A typical home not using electricity for heating would use a maximum of about 2.5 kW sometime during the year.

However, homes will not all be at their maximum use at the same hour. The maximum use at the same hour is known as the coincident load and is the system peak hour. This is known as the coincident peak load. A typical home not using electricity for heating would use about 1.6 kW at the coincident peak. Therefore 1 MW is approximately the coincident peak requirement of 600 typical homes not using electricity for heating.

General Consumers Sales

General Consumers Sales includes the energy supplied to all of Manitoba Hydro's individually billed customers, but excludes export sales. In 2010/11, Manitoba Hydro had 534,827 General Consumers Sales customers who used 20,786 GW.h. General Consumers Sales are divided into three sectors:

(1) Residential, with 467,382 customers who used 7,060 GW.h.
(2) General Service, with 66,261 customers who used 13,624 GW.h, and
(3) Area and Roadway Lighting, with 1,184 customers who used 103 GW.h.

Almost all of the sales are supplied through what is called Manitoba Hydro's Integrated System. This is the power grid that connects Manitoba Hydro's generation sources to its customers. There are still four remote northern communities in Manitoba that have diesel generators and are not connected to the grid. They include 726 customers who used 13 GW.h of electricity in 2010/11. These sales need to be subtracted from General Consumers Sales when calculating the load on the Integrated System.

Most of Manitoba Hydro's customers are billed throughout the month. The day their meter is read depends on what cycle they are in. One customer may be read on the 5th of the month, and another on the 21st of the month. These various cycles are added up to total the consumption for what is called the "billing month". All sales in this document report on this billing month basis.

Sales data is not precise. Most customers have their meter read or self-read every second month. The other month gets estimated by the Manitoba Hydro billing system based on their previous usage and weather conditions. The estimated reading is not 100% accurate, and that inaccuracy in the estimate will be transferred equally and opposite to the meter reading, resulting in an inaccuracy in both months. In addition, billing data includes positive or negative adjustments and corrections, often made a month or even several months after the period in question. Seasonal customers are only read twice a year and their six-month usage is added to the April and October billing months. Unmetered services (for example, flat rate water heat) assume a monthly consumption. Services change rate groups, causing load in one group to rise and the other to fall. This information added together is what contributes to the kW.h sales figures reported by the billing system that are used for the sales forecast in this document.

GENERAL CONSUMERS SALES (Average Annual Customers)
History and Forecast
2000/01 - 2030/31

Fiscal	Residential			General Service				Lighting	Total
Year	Basic	Seas	Diesel	Basic	Seas	Diesel	SEP		Custs
2000/01	409090	20308	515	59791	793	144	30	751	491422
2001/02	411656	20263	501	60111	778	149	29	756	494243
2002/03	413812	20219	499	60291	786	148	33	755	496543
2003/04	416690	20056	500	60699	788	151	33	757	499674
2004/05	420135	20075	508	60950	793	160	31	759	503411
2005/06	423742	20145	519	61517	814	168	28	793	507726
2006/07	427886	20312	525	63622	783	169	28	1129	514454
2007/08	432144	20437	531	63881	798	175	27	1142	519135
2008/09	437263	20648	540	64166	818	178	24	1175	524812
2009/10	441710	20839	539	64784	830	177	24	1191	530094
2010/11	445882	20950	550	65219	842	176	24	1184	534827
2011/12	450399	21111	554	65742	849	177	26	1158	540016
2012/13	455614	21286	559	66322	854	178	26	1166	546005
2013/14	461353	21461	564	66989	859	180	0	1175	552581
2014/15	467089	21636	570	67638	864	181	0	1185	559163
2015/16	472941	21811	575	68288	869	183	0	1195	565862
2016/17	478890	21986	580	68930	874	184	0	1204	572648
2017/18	484868	22161	586	69561	879	186	0	1214	579455
2018/19	490811	22336	591	70159	884	187	0	1224	586192
2019/20	496708	22511	596	70733	889	189	0	1233	592859
2020/21	502547	22686	602	71299	894	190	0	1243	599461
2021/22	508313	22861	607	71856	899	192	0	1252	605980
2022/23	513994	23036	612	72404	904	193	0	1262	612405
2023/24	519576	23211	617	72941	909	195	0	1272	618721
2024/25	525046	23386	623	73465	914	196	0	1281	624911
2025/26	530395	23561	628	73976	919	198	0	1291	630968
2026/27	535617	23736	633	74475	924	199	0	1301	636885
2027/28	540705	23911	639	74960	929	201	0	1310	642655
2028/29	545658	24086	644	75431	934	202	0	1320	648275
2029/30	550471	24261	649	75887	939	204	0	1329	653740
2030/31	555142	24436	655	76330	944	205	0	1339	659051

GENERAL CONSUMERS SALES (GW.h)
History and Forecast
2000/01 - 2030/31

Fiscal Year	Residential	General Service	Area & Roadway Lighting	General Consumers Sales	Total Diesel	General Consumers Sales Less Diesel
2000/01	5830	11673	87	17590	10	17580
2001/02	5765	11951	89	17805	11	17793
2002/03	6361	12796	90	19246	10	19236
2003/04	6266	12923	91	19280	11	19269
2004/05	6370	13274	91	19735	12	19724
2005/06	6266	13577	91	19935	12	19923
2006/07	6539	13870	101	20510	12	20497
2007/08	6838	14123	101	21061	12	21049
2008/09	6954	14154	102	21210	13	21198
2009/10	6899	13485	102	20486	13	20473
2010/11	7060	13624	103	20786	13	20773
2011/12	7227	14182	104	21513	13	21499
2012/13	7326	14560	105	21991	13	21977
2013/14	7437	15062	106	22605	14	22591
2014/15	7550	15259	107	22916	14	22902
2015/16	7668	15265	107	23040	14	23026
2016/17	7789	15494	108	23391	14	23377
2017/18	7912	15747	109	23768	14	23754
2018/19	8035	15867	110	24012	15	23998
2019/20	8160	16169	111	24440	15	24425
2020/21	8284	16480	112	24877	15	24862
2021/22	8409	16729	113	25252	15	25236
2022/23	8535	16977	114	25626	15	25610
2023/24	8660	17223	115	25997	16	25982
2024/25	8785	17467	116	26368	16	26352
2025/26	8910	17709	117	26735	16	26719
2026/27	9035	17948	118	27100	16	27084
2027/28	9159	18186	119	27464	16	27447
2028/29	9284	18417	120	27821	17	27804
2029/30	9408	18646	121	28175	17	28158
2030/31	9533	18873	121	28528	17	28511

Components of Manitoba Energy

There are over 100 substations throughout the Province. These substations convert high voltage energy supplied by the generating stations to lower voltages that is then distributed to customers. The total energy metered at the substations is summarized by calendar month and referred to as the Manitoba Load at Common Bus, and was 21,806 GW.h in 2010/11. Common Bus does not supply diesel sites, so it supplies energy to General Consumers Sales less Diesel.

Some energy is used or lost between the substations and sales. Energy metered for construction of Manitoba Hydro projects is given its own category between Sales and Common Bus, called Construction Power. It includes some persistent heating load at former construction town sites. Construction Power in 2010/11 was 85 GW.h.

The rest of the difference between Common Bus and Sales is called Distribution Losses. Although much of the difference will be transformation and line losses, Distribution Losses are also a catchall for inaccuracies in estimated readings, adjustments, unbilled consumption, and theft of energy. It also includes the difference in usage due to the change from billing months (Sales) to calendar months (Common Bus). Distribution losses in 2010/11 were 947 GW.h, which was 4.6% of General Consumers Sales less Diesel.

Total Generation is the total metered generation of all power stations. It is summarized by calendar month. Exports to other utilities are subtracted and imports from other utilities are added. This includes line losses that are incurred in transmitting the power through the HVDC lines and to the substations at Common Bus. A portion of these losses are allocated to the imports and exports. The rest are the Transmission Losses on the Manitoba Load, and was 1,977 GW.h in 2010/11.

Manitoba Hydro has some customers who can self-generate and are on a rate that allows power to them to be interrupted if the need arises. Their usage is considered Non-Firm Energy and in 2010/11 was 25 GW.h. Manitoba Hydro only needs to plan for “Firm” power requirements, and the Non-Firm power is subtracted from the Generation numbers.

Net Firm Energy was 23,758 GW.h in 2010/11. The power stations required 134 GW.h (Station Service) to generate the power. The resulting Gross Firm Energy was 23,892 GW.h in 2010/11.

Table 3 - Components of Manitoba Energy

MANITOBA FIRM ENERGY (GW.h)
History and Forecast
2000/01 - 2030/31

Fiscal Year	General Consumer Sales less Diesel	Dist. Losses	Const. Power	Manitoba Load at Common Bus	Trans. Losses	Less Non Firm Energy	Net Firm Energy	Station Service	Gross Firm Energy
2000/01	17580	802	46	18428	1696	48	20075	187	20262
2001/02	17793	819	42	18655	1864	25	20494	162	20656
2002/03	19236	671	46	19953	2012	24	21940	170	22110
2003/04	19269	804	43	20116	1792	17	21890	179	22069
2004/05	19724	830	46	20600	1852	26	22426	163	22589
2005/06	19923	797	42	20761	1860	23	22598	158	22757
2006/07	20497	900	45	21442	1885	22	23305	159	23464
2007/08	21049	940	47	22036	1949	24	23961	161	24122
2008/09	21198	1052	56	22305	1979	22	24262	154	24417
2009/10	20473	813	75	21361	1934	20	23275	137	23412
2010/11	20773	947	85	21806	1977	25	23758	134	23892
2011/12	21499	916	98	22513	1988	26	24475	140	24615
2012/13	21977	948	97	23022	2033	26	25030	143	25173
2013/14	22591	1005	99	23695	2093	0	25787	143	25930
2014/15	22902	1029	89	24019	2122	0	26141	143	26284
2015/16	23026	1034	72	24132	2131	0	26264	143	26406
2016/17	23377	1049	62	24488	2163	0	26651	143	26794
2017/18	23754	1065	47	24866	2196	0	27062	143	27205
2018/19	23998	1075	47	25120	2218	0	27338	143	27481
2019/20	24425	1093	47	25565	2258	0	27823	143	27966
2020/21	24862	1112	47	26021	2298	0	28319	143	28462
2021/22	25236	1128	47	26412	2332	0	28744	143	28887
2022/23	25610	1144	47	26802	2367	0	29169	143	29311
2023/24	25982	1160	47	27189	2401	0	29590	143	29733
2024/25	26352	1176	47	27575	2435	0	30011	143	30153
2025/26	26719	1192	47	27958	2469	0	30427	143	30570
2026/27	27084	1207	47	28338	2503	0	30841	143	30984
2027/28	27447	1223	47	28717	2536	0	31253	143	31396
2028/29	27804	1238	47	29089	2569	0	31658	143	31801
2029/30	28158	1258	47	29463	2602	0	32065	143	32208
2030/31	28511	1273	47	29831	2634	0	32465	143	32608

Economic Assumptions

Economic forecast assumptions are taken from the 2011 Economic Outlook and the 2011 Energy Price Outlook. These documents contain Manitoba Hydro's forecasts of economic variables including prices of electricity, natural gas and oil, Gross Domestic Product (GDP), Manitoba population and residential customers.

The following are the economic variables used in the preparation of this Electric Load Forecast:

Residential Customers - The number of Residential Basic customers in Manitoba is forecast to increase by 1.0% (4,549 units) in 2011/12 and averages 1.1% per year over the forecast period. This compares to a historical average increase of 0.9% per year over the last ten years. This is used in the Residential and GS Mass Market customer forecasts.

Electricity Prices - The electricity price forecast is based on CPI and rate increase projections contained in the Integrated Financial Forecast. The real electricity price is forecast to decrease 0.1% in 2011/12 and then increase 1.4% per year throughout the rest of the forecast period. This is used in the Residential customer forecast.

Natural Gas Prices – Manitoba Hydro views the natural gas price forecast as commercially sensitive information. Consistent with the Clean Environment Commission and Electric General Rate Application, this information will not be publicly disclosed. This is used in the Residential customer forecast.

Gross Domestic Product (GDP) - The forecast for real economic growth in Manitoba is 2.7% in 2011/12; 2.8% in 2012/13; 2.9% in 2013/14; 2.6% in 2014/15; 2.5% in 2015/16; 2.3% in 2016/17; then decreasing to 1.9% in 2017/18 where it will remain at that level for the remainder of the forecast period. This is used in the GS Mass Market customer forecast.

Normal Weather Assumptions

Weather for forecast purposes is measured by degree days. Winnipeg temperatures are used, as Winnipeg is central to most of the weather-dependent load (Residential and General Service Mass Market) in Manitoba.

Cold weather is expressed in Degree Days Heating (DDH), which is the number of average degrees colder than 14 degrees Celsius each day. Hot weather is expressed in Degree Days Cooling (DDC), which is the number of average degrees warmer than 18 degrees Celsius each day. Daily temperature is the average of the high and low temperature for the day. The equations are:

DDH = sum (max(0, 14 - (Daily high + Daily low) / 2))

DDC = sum (max(0, (Daily high + Daily low) / 2) - 18)

The base temperature of 14 degrees for DDH is the temperature below which most buildings have their heating systems (furnaces) running.

The base temperature of 18 degrees for DDC is the temperature above which buildings start to run their space cooling systems (air-conditioning).

The forecast is prepared assuming normal weather. Normal weather is determined from the 25 year average of Degree Days Heating and Degree Days Cooling in Winnipeg over the period April 1986 to March 2011.

The 25 year weather normals used for every year of this forecast are 4,536.7 DDH and 184.2 DDC. This is a decrease of 10.4 DDH from last year's normal of 4,547.1 DDH, and an increase of 3.8 DDC from last year's normal of 180.4 DDC.

The range of DDH from 1986 to 2011 was from a warm winter of 3,979.9 DDH in 2005/06 (556.8 DDH below normal) to a cold winter of 5,439.3 DDH in 1995/96 (902.6 DDH above normal).

The range of DDC from 1986 to 2011 was from a cool summer of 71.8 DDC in 2004/05 (108.6 DDC below normal) to a hot summer of 364.1 DDC in 1988/89 (183.7 DDC above normal).

Weather Effect and Weather Adjustment

The weather effect is determined in any sector by regressing the last two years of actual monthly energies against the actual DDH and DDC for the month. This results in a GW.h per DDH effect and a GW.h per DDC effect for that sector.

Only sectors whose major variation is due to weather can have a weather effect estimated. Sectors that vary primarily due to industrial output levels or seasonal but non-weather reasons may yield false weather effects if estimated. Weather effects are not determined for the GS Top Consumers, Seasonal, Diesel, Water Heating and Lighting sectors. Assigning them a weather affect and weather adjusting them will not improve their forecast.

For sectors where a weather effect is calculated, this document will show energy as the reported value and as a weather adjusted value. Forecasts are based on the weather adjusted values. The calculation and weather affects are:

Weather Adjustment = DDH weather effect * (DDH actual - DDH normal)
+ DDC weather effect * (DDC actual - DDC normal)

Weather Adjusted Actual = Actual - Weather Adjustment

Residential: 0.6 GW.h / DDH, 1.4 GW.h / DDC
GS Mass Market: 0.3 GW.h / DDH, 1.2 GW.h / DDC
General Consumers Sales: 0.9 GW.h / DDH, 2.7 GW.h / DDC
System Energy: 1.0 GW.h / DDH, 3.0 GW.h / DDC
System Peak: 40 MW / degree (at -30 degrees Celsius),
120 MW / degree (at +30 degrees Celsius)

Demand Side Management (DSM) in the Forecast

This forecast includes future DSM savings associated with the Basic Customer Information and Service, also known as standards. This DSM level is the minimum amount of DSM services and activity that Manitoba Hydro will provide to customers in the future. All other DSM programs are not included in the forecast.

The savings associated with other DSM options are treated as a supply-side resource and are not included in this forecast. The forecast DSM savings are not listed in this document, but are detailed in Manitoba Hydro's 2011 Power Smart Plan.

FORECAST OVERVIEW

Gross Firm Energy was 23,892 GW.h in 2010/11. Gross Total Peak was 4,286 MW.

Gross Firm Energy is forecast to grow to 32,608 GW.h by 2030/31 at an average growth of 432 GW.h or 1.6% per year. Gross Total Peak is forecast to grow to 6,081 MW by 2030/31 at an average growth of 80 MW or 1.5% per year.

The weather adjusted Gross Firm Energy for 2010/11 was 150 GW.h lower than was forecast in the 2010 Electric Load Forecast.

The Gross Firm Energy forecast for 2011 starts down 124 GW.h in 2011/12 but is up the next three years. It is again down for the next five years due to the expected drop of load from a Top Consumer. By 2030/31, the Gross Firm Energy forecast is up 331 GW.h from the 2010 forecast, which is equivalent to 3/4 of a year of firm energy growth.

By 2030/31, the Gross Total Peak forecast starts down 28 MW in 2011/12 and remains down for the next six years. After that, the forecast is up and by 2030/31 is 129 MW higher than the 2010 forecast.

GROSS FIRM ENERGY AND GROSS TOTAL PEAK
Change from Previous Forecast

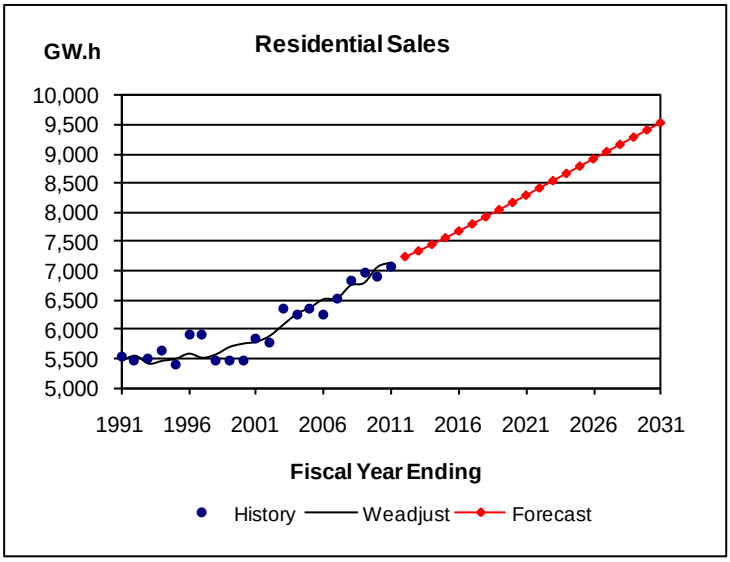
Fiscal Year	GROSS FIRM ENERGY			GROSS TOTAL PEAK		
	2010 Forecast (GW.h)	2011 Forecast (GW.h)	Change (GW.h)	2010 Forecast (MW)	2011 Forecast (MW)	Change (MW)
2010/11 Act.		23892			4286	
Weather Adj.		75			192	
2010/11	24117	23967	(150)	4506	4478	(28)
2011/12	24739	24615	(124)	4604	4557	(47)
2012/13	25142	25173	31	4677	4649	(28)
2013/14	25807	25930	123	4776	4767	(9)
2014/15	26180	26284	103	4842	4840	(2)
2015/16	26599	26406	(192)	4913	4888	(25)
2016/17	27055	26794	(262)	4990	4967	(22)
2017/18	27362	27205	(158)	5048	5050	2
2018/19	27657	27481	(176)	5106	5115	8
2019/20	28016	27966	(50)	5171	5203	32
2020/21	28381	28462	81	5238	5293	55
2021/22	28748	28887	139	5305	5374	69
2022/23	29120	29311	191	5373	5455	82
2023/24	29496	29733	237	5442	5535	94
2024/25	29878	30153	275	5511	5615	104
2025/26	30269	30570	301	5583	5695	112
2026/27	30663	30984	321	5655	5773	118
2027/28	31062	31396	334	5728	5851	123
2028/29	31464	31801	337	5802	5928	126
2029/30	31869	32208	339	5877	6005	128
2030/31	32277	32608	331	5952	6081	129

FORECAST DETAILS

Residential

Figure 1- Residential Sales

The Residential sector made up 34.0% of the electricity sales in Manitoba in 2010/11. It includes sales to residential customers for non-business operations. The Residential sector is comprised of four rate groups (Basic, Diesel, Seasonal, and Flat Rate Water Heating). The Residential sector had minimal growth during the 1990's but growth has been steady since about 1999.



Weather adjusted Residential Sales has grown from 5,557 GW.h in 1991/92 to 7,145 GW.h in 2010/11 at an average growth of 84 GW.h or 1.3% per year. It is forecast to grow to 9,533 GW.h by 2030/31 at an average growth of 119 GW.h or 1.5% per year.

Table 5 - Residential Sales

RESIDENTIAL (GW.h) HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Sales	Weather Adjust	Adjusted Sales	Fiscal Year	Forecast Sales
1991/92	5458	99	5557	2011/12	7227
1992/93	5489	-68	5422	2012/13	7326
1993/94	5632	-162	5470	2013/14	7437
1994/95	5388	118	5505	2014/15	7550
1995/96	5907	-314	5593	2015/16	7668
1996/97	5910	-387	5523	2016/17	7789
1997/98	5473	108	5582	2017/18	7912
1998/99	5482	225	5707	2018/19	8035
1999/00	5455	309	5764	2019/20	8160
2000/01	5830	-34	5796	2020/21	8284
2001/02	5765	133	5899	2021/22	8409
2002/03	6361	-273	6088	2022/23	8535
2003/04	6266	5	6272	2023/24	8660
2004/05	6370	12	6381	2024/25	8785
2005/06	6266	257	6523	2025/26	8910
2006/07	6539	-2	6537	2026/27	9035
2007/08	6838	-80	6758	2027/28	9159
2008/09	6954	-154	6801	2028/29	9284
2009/10	6899	174	7073	2029/30	9408
2010/11	7060	85	7145	2030/31	9533

Residential Basic

The Residential Basic rate group represents 98.4% of the total Residential sales. During 2010/11, there was an average of 445,882 Residential Basic customers, and the group consumed 6,952 GW.h.

158,012 residences have electric space heating systems (furnaces, baseboards, boilers or geothermal) and are directly billed by Manitoba Hydro. These customers are called “Electric Heat Billed” since they pay for their own space heating on their electricity bill.

The other customers either use natural gas, other fuels for heating, or heat with electricity but do not pay directly for heating on their own electric bill. In the latter case, often it is a common service, such as a General Service Basic meter of an apartment block complex that is supplying and paying for the electric space heat for the residence.

The Residential Basic sales table on the next page summarizes the average customers, total GW.h and average use in kW.h/yr. The percentage of electric heat billed customers is currently at 35.4% and is forecast to rise to 40.2% by 2031. The average use of electric heat billed customers remains fairly constant over the forecast period. The average use of other customers is growing slowly, primarily due to increases in electric water heating and miscellaneous end uses.

Table 6 - Residential Basic Sales

RESIDENTIAL BASIC SALES
History and Forecast
2010/11 - 2030/31

Fiscal Year	Electric Heat Billed			Other			Total Basic			% Elec Space Heat	% Elec Water Tanks
	(Custs.)	(GW.h)	(Avg.)	(Custs.)	(GW.h)	(Avg.)	(Custs.)	(GW.h)	(Avg.)		
2010/11	158012	4036	25545	287870	2916	10129	445882	6952	15592	35.4%	47.8%
2011/12	160849	4157	25847	289549	2961	10226	450399	7118	15805	35.7%	49.3%
2012/13	164043	4232	25800	291571	2983	10232	455614	7216	15837	36.0%	51.0%
2013/14	167547	4316	25758	293806	3010	10244	461353	7326	15878	36.3%	52.5%
2014/15	171056	4400	25723	296032	3037	10261	467089	7438	15923	36.6%	54.0%
2015/16	174627	4487	25693	298314	3067	10280	472941	7554	15971	36.9%	55.5%
2016/17	178242	4575	25668	300648	3098	10304	478890	7673	16022	37.2%	56.8%
2017/18	181856	4664	25648	303011	3130	10330	484867	7794	16075	37.5%	58.1%
2018/19	185430	4753	25632	305381	3163	10358	490811	7916	16129	37.8%	59.3%
2019/20	188955	4841	25622	307753	3197	10390	496708	8039	16184	38.0%	60.4%
2020/21	192427	4929	25616	310120	3233	10424	502547	8162	16241	38.3%	61.5%
2021/22	195838	5016	25615	312475	3269	10460	508313	8285	16299	38.5%	62.5%
2022/23	199181	5103	25619	314813	3305	10500	513995	8408	16359	38.8%	64.0%
2023/24	202451	5188	25627	317125	3343	10542	519576	8531	16420	39.0%	65.5%
2024/25	205640	5273	25641	319406	3382	10587	525046	8654	16483	39.2%	66.6%
2025/26	208745	5356	25660	321650	3421	10635	530395	8777	16548	39.4%	67.6%
2026/27	211763	5439	25683	323853	3461	10687	535617	8900	16616	39.5%	68.5%
2027/28	214693	5520	25712	326013	3502	10742	540705	9022	16686	39.7%	69.3%
2028/29	217532	5601	25747	328126	3544	10801	545658	9145	16759	39.9%	70.1%
2029/30	220281	5680	25785	330190	3586	10862	550471	9266	16834	40.0%	70.9%
2030/31	222939	5759	25830	332203	3630	10928	555142	9389	16913	40.2%	71.7%

Residential Diesel, Seasonal, and Flat Rate Water Heating

Residential Diesel

In 2010/11, there were 550 Residential Diesel customers that used 7.7 GW.h in 2010/11 at an average of 13,943 kW.h per customer. They have 60 amp service that does not allow for electric heating. The number of customers is expected to grow to 655 by 2030/31. Usage is expected to increase to 10.7 GW.h and 16,406 kW.h per customer by 2030/31, under the assumption that they will remain as Diesel sites.

Residential Seasonal

There were 20,950 Residential Seasonal customers in 2010/11. The number of customers is expected increase to 24,436 customers by in 2030/31. The average use of each customer is expected to grow from 3,675 kW.h/yr in 2010/11 to 5,120 kW.h/yr in 2030/31. Usage is forecast to increase from 77.0 GW.h in 2010/11 to 125.1 GW.h in 2030/31.

Residential Flat Rate Water Heating

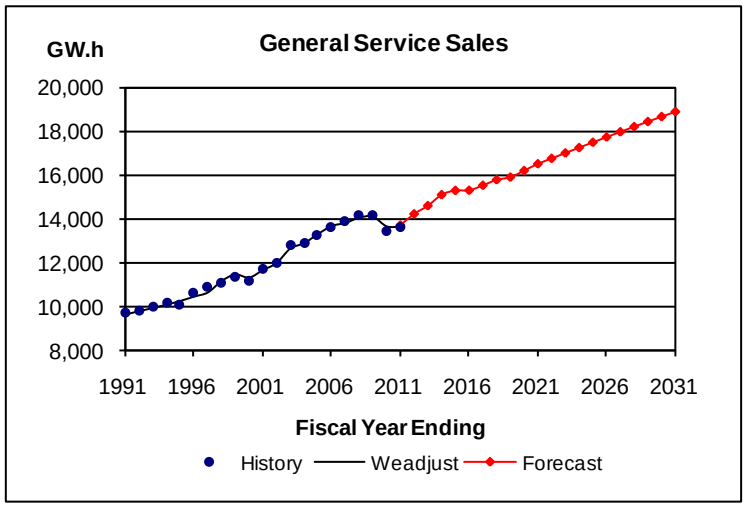
Residential Water Heating is a flat rate unmetered service. This service has not been available to new customers since November 12, 1969. There were 4,535 remaining services in 2010/11. The number of services is expected to decrease 5% per year throughout the forecast period and be down to 1,627 by 2030/31. Usage was 23.0 GW.h in 2010/11 and that will decrease to 8.2 GW.h by 2030/31.

Table 7 - Total Residential Sales

TOTAL RESIDENTIAL SALES History and Forecast 2000/01 - 2030/31						
Fiscal Year	Basic (GW.h)	Diesel (GW.h)	Seasonal (GW.h)	FRWH (GW.h)	Total Residential (GW.h)	Change (%)
2000/01	5737	5	49	39	5830	6.9%
2001/02	5674	6	49	37	5765	-1.1%
2002/03	6266	6	54	35	6361	10.3%
2003/04	6170	6	56	34	6266	-1.5%
2004/05	6275	7	58	31	6370	1.7%
2005/06	6171	7	59	30	6266	-1.6%
2006/07	6443	7	60	29	6539	4.3%
2007/08	6736	7	68	27	6838	4.6%
2008/09	6847	7	74	25	6954	1.7%
2009/10	6786	7	81	24	6899	-0.8%
2010/11	6952	8	77	23	7060	2.3%
2011/12	7118	8	79	22	7227	2.4%
2012/13	7216	8	81	21	7326	1.4%
2013/14	7326	8	84	20	7437	1.5%
2014/15	7438	8	86	19	7550	1.5%
2015/16	7554	8	88	18	7668	1.6%
2016/17	7673	9	90	17	7789	1.6%
2017/18	7794	9	93	16	7912	1.6%
2018/19	7916	9	95	15	8035	1.6%
2019/20	8039	9	97	14	8160	1.5%
2020/21	8162	9	100	14	8284	1.5%
2021/22	8285	9	102	13	8409	1.5%
2022/23	8408	9	105	12	8535	1.5%
2023/24	8531	10	107	12	8660	1.5%
2024/25	8654	10	110	11	8785	1.4%
2025/26	8777	10	112	11	8910	1.4%
2026/27	8900	10	115	10	9035	1.4%
2027/28	9022	10	117	10	9159	1.4%
2028/29	9145	10	120	9	9284	1.4%
2029/30	9266	11	122	9	9408	1.3%
2030/31	9389	11	125	8	9533	1.3%

General Service

Figure 2 - General Service Sales



The General Service sector represents 65.5% of all sales in Manitoba. This sector is made up of sales to Commercial and Industrial customers served by Manitoba Hydro. This sector consists of five rate groups (Basic, Diesel, Seasonal, Flat Rate Water Heating and Surplus Energy Program). Basic represent 99.7% of all General Service sales and is divided into Mass Market and GS Top Consumers. The adjacent graph shows continuous load growth in General Service sales over the last twenty years, with reversals in 1999/00 and 2009/10 reflecting the impact of the economic recessions of those years.

Weather adjusted General Service sales have grown from 9,804 GW.h in 1991/92 to 13,670 GW.h in 2010/11 at an average growth of 203 GW.h or 1.8% per year. It is forecast to grow to 18,873 GW.h by 2030/31 at an average growth of 260 GW.h or 1.6% per year.

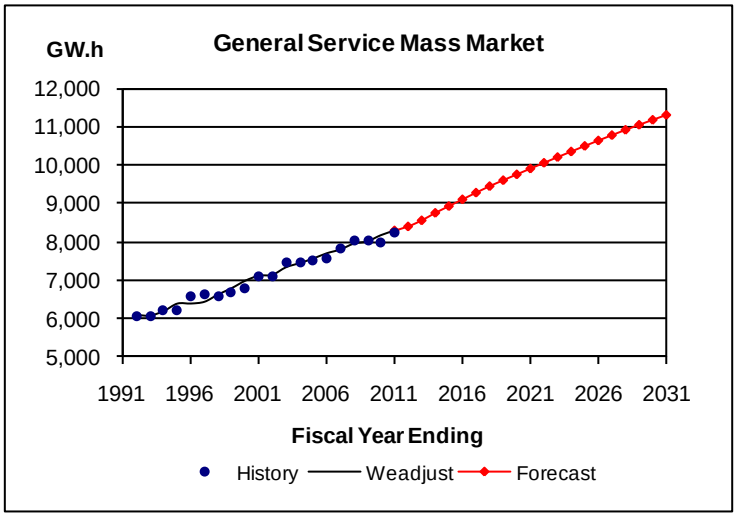
Table 8 - General Service Sales

GENERAL SERVICE (GW.h) HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Sales	Weather Adjust	Adjusted Sales	Fiscal Year	Forecast Sales
1991/92	9772	32	9804	2011/12	14182
1992/93	9954	-11	9943	2012/13	14560
1993/94	10126	-24	10102	2013/14	15062
1994/95	10120	148	10268	2014/15	15259
1995/96	10659	-190	10469	2015/16	15265
1996/97	10855	-198	10658	2016/17	15494
1997/98	11121	59	11180	2017/18	15747
1998/99	11360	120	11479	2018/19	15867
1999/00	11152	186	11338	2019/20	16169
2000/01	11673	5	11678	2020/21	16480
2001/02	11951	55	12006	2021/22	16729
2002/03	12796	-130	12665	2022/23	16977
2003/04	12923	-14	12909	2023/24	17223
2004/05	13274	50	13325	2024/25	17467
2005/06	13577	118	13695	2025/26	17709
2006/07	13870	-35	13835	2026/27	17948
2007/08	14123	-47	14075	2027/28	18186
2008/09	14154	-28	14126	2028/29	18417
2009/10	13485	197	13682	2029/30	18646
2010/11	13624	46	13670	2030/31	18873

General Service Mass Market

General Service Mass Market includes all Commercial and Industrial customers, excluding the General Service Top Consumers. Approximately 85% of the GS Mass Market customers are Commercial and the others are Industrial.

Figure 3 - General Service Mass Market



GS Mass Market has grown steadily throughout the last twenty years. This load generally does not fluctuate dramatically since the commercial and small industrial infrastructure is established and continues to grow slowly.

GS Mass Market is forecast to increase from a weather adjusted value of 8,304 GW.h in 2010/11 to 11,308 GW.h by 2030/31. This represents an average growth of 150 GW.h or 1.6% per year.

Table 9 - General Service Mass Market

GENERAL SERVICE MASS MARKET (GW.h) HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Sales	Weather Adjust	Adjusted Sales	Fiscal Year	Forecast Sales
1991/92	6050	32	6083	2011/12	8408
1992/93	6077	-11	6066	2012/13	8566
1993/94	6210	-24	6186	2013/14	8762
1994/95	6233	148	6381	2014/15	8937
1995/96	6573	-190	6383	2015/16	9113
1996/97	6627	-198	6430	2016/17	9287
1997/98	6562	59	6621	2017/18	9456
1998/99	6668	120	6788	2018/19	9611
1999/00	6796	186	6982	2019/20	9763
2000/01	7110	5	7115	2020/21	9914
2001/02	7084	55	7139	2021/22	10063
2002/03	7467	-130	7336	2022/23	10211
2003/04	7460	-14	7446	2023/24	10357
2004/05	7516	50	7566	2024/25	10502
2005/06	7587	118	7705	2025/26	10643
2006/07	7839	-35	7804	2026/27	10783
2007/08	8006	-47	7959	2027/28	10921
2008/09	8049	-28	8020	2028/29	11052
2009/10	7985	197	8182	2029/30	11181
2010/11	8258	46	8304	2030/31	11308

General Service Top Consumers

General Service Top Consumers includes the top energy consuming businesses in Manitoba and represents 40% of all electricity consumed in the General Service sector and 26% of all electricity Sales. GS Top Consumers includes 17 consumers (companies) that account for 25 customers in the Primary Metals, Chemicals, Petrol/Oil/Natural Gas, Pulp/Paper, Food/Beverage, and the Mining and Colleges/Universities sectors.

Figure 4 - General Service Top Consumers

GS Top Consumers has grown considerably over the last twenty years. This group is very sensitive to economic conditions, clearly demonstrated by the drop in usage during the economic downturns of 1999/00 and 2009/10. Despite the expected loss of a major load by 2016, GS Top Consumers is expected to return to normal growth due to its widely diversified market.

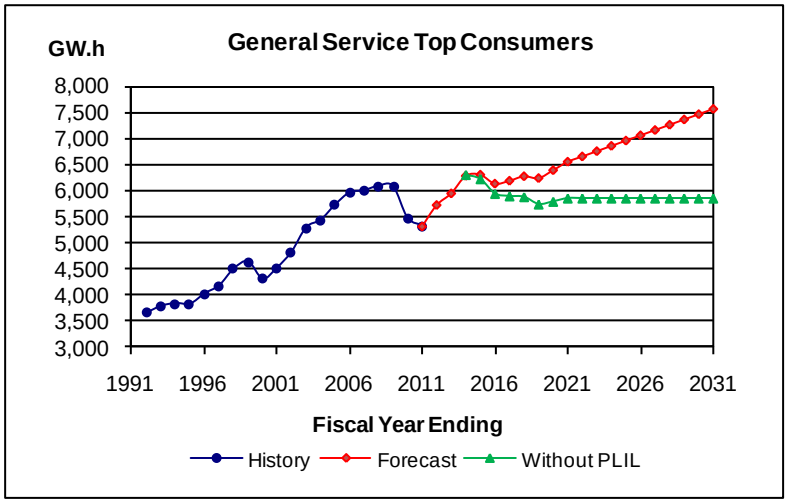


Table 10 - General Service Top Consumers

GENERAL SERVICE TOP CONSUMERS (GW.h) HISTORICAL/FORECAST WITH PLIL					
Fiscal Year	Sales	Fiscal Year	Individual	PLIL	Total
1991/92	3655	2011/12	5730	0	5730
1992/93	3783	2012/13	5951	0	5951
1993/94	3836	2013/14	6284	0	6284
1994/95	3825	2014/15	6206	100	6306
1995/96	4021	2015/16	5936	200	6136
1996/97	4173	2016/17	5891	300	6191
1997/98	4493	2017/18	5876	400	6276
1998/99	4632	2018/19	5741	500	6241
1999/00	4299	2019/20	5791	600	6391
2000/01	4515	2020/21	5851	700	6551
2001/02	4818	2021/22	5851	800	6651
2002/03	5282	2022/23	5851	900	6751
2003/04	5423	2023/24	5851	1000	6851
2004/05	5714	2024/25	5851	1100	6951
2005/06	5948	2025/26	5851	1200	7051
2006/07	5989	2026/27	5851	1300	7151
2007/08	6075	2027/28	5851	1400	7251
2008/09	6065	2028/29	5851	1500	7351
2009/10	5461	2029/30	5851	1600	7451
2010/11	5324	2030/31	5851	1700	7551

GS Top Consumers are forecast individually as their usage does not grow in a slow, steady, predictable pattern. These types of load changes are not conducive to econometric forecasting models and must be examined on an individual basis. The forecast for each company includes their short term committed plans and expectations over the next several years, but excludes longer term plans that are uncommitted and subject to change.

The sum of the individual company forecasts start at 5,324 GW.h in 2010/11 and grow to 5,851 GW.h within ten years. This is a growth of 527 GW.h despite the expected major load decrease by 2015 for one customer.

For the longer term, the average expected growth for all customers combined is included. This added growth is called Potential Large Industrial Loads (PLIL). It includes consideration for company expansions, cutbacks and shutdowns, new startups of 50 GW.h a year or more, and the long term normal incremental growth of all the companies combined. Since short term customer intentions are known, no PLIL is added to the first three years of the forecast. PLIL is added beginning in 2014/15.

Potential Large Industrial Loads are forecast to be 100 GW.h per year. Since 1987, there have been 10 major increases of load of 50 GW.h or more, and 3 major losses of load of 50 GW.h or more to General Service Top Consumers. The net effect has been an addition of 69 GW.h per year. Normal company growth has added another 23 GW.h per year. The combined effect is that GS Top Consumers has grown from 3,104 GW.h in 1987 to 5,324 GW.h in 2011, a growth of 92 GW.h or 2.3% per year.

By 2030/31, the total contribution of PLIL is forecast to be 1,700 GW.h. This is approximately equivalent to the load of Manitoba Hydro's largest consumer. If only one other customer of similar size starts up in Manitoba in the next 20 years, this one new customer alone will consume all of the provision that PLIL has allowed.

Including Potential Large Industrial Loads, GS Top Consumers is forecast to grow from 5,324 GW.h in 2010/11 to 7,551 GW.h in 2030/31, for an average growth of 111 GW.h or 1.8% per year.

General Service Diesel, Seasonal, and Flat Rate Water Heat

General Service Diesel

In 2010/11, there were 176 General Service Diesel Full Cost customers. They used 5.4 GW.h in 2010/11. The forecast is that by 2030/31 there will be 205 customers who will use 6.4 GW.h.

General Service Seasonal

There were 842 General Service Seasonal customers in 2010/11. The number of customers is expected to increase by five customers per year throughout the forecast period. Consumption was 4.7 GW.h in 2010/11 and is expected to grow to 5.2 GW.h by 2030/31.

General Service Flat Rate Water Heating

General Service Water Heating is a flat rate unmetered service that has not been available since November 12, 1969. There were 448 remaining services in 2010/11. The number of services is expected to decrease 5% per year throughout the forecast period with 159 remaining by 2030/31. Sales were 7.8 GW.h in 2010/11 and that is forecast to decrease to 2.8 GW.h by 2030/31.

General Service Surplus Energy Program

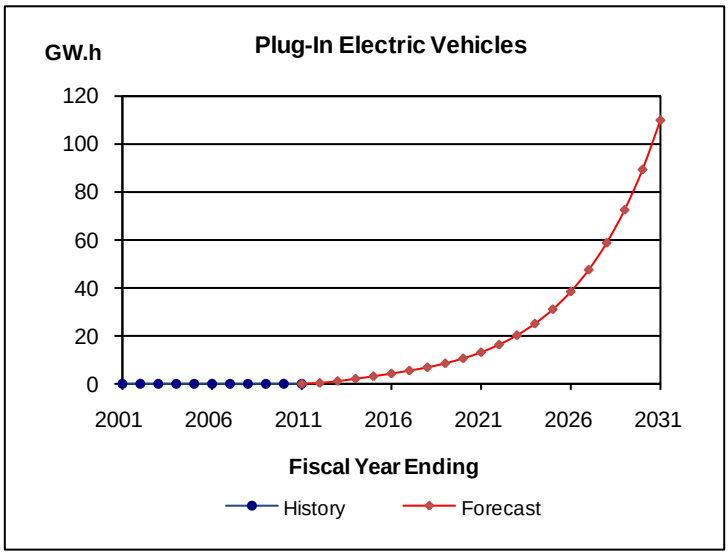
Participants in the Surplus Energy Program (SEP) are expected to consume 26 GW.h per year in 2011/12 and 2012/13 period. The program has only been approved until March 2013. This energy is considered to be “interruptible” and thus “non-firm”. The energy used by these customers is included in Sales. But it is excluded from the Net Firm Energy and Gross Firm Energy forecasts. After March 2013, this load is assumed to become part of the firm load and has been included in the General Service Mass Market forecast.

Table 11 - Total General Service Sales

TOTAL GENERAL SERVICE SALES History and Forecast 2000/01 - 2030/31								
Fiscal Year	Mass Market (GW.h)	Top Consumers (GW.h)	Diesel (GW.h)	Seasonal (GW.h)	FRWH (GW.h)	SEP/DFH (GW.h)	Total General Service (GW.h)	Change (%)
2000/01	7110	4515	4	4	15	26	11673	4.7%
2001/02	7084	4818	5	4	14	24	11951	2.4%
2002/03	7467	5282	4	4	14	25	12796	7.1%
2003/04	7460	5423	5	5	13	17	12923	1.0%
2004/05	7516	5714	5	5	10	25	13274	2.7%
2005/06	7587	5948	5	5	9	23	13577	2.3%
2006/07	7839	5989	5	4	9	23	13870	2.2%
2007/08	8006	6075	5	4	9	24	14123	1.8%
2008/09	8049	6065	5	5	8	22	14154	0.2%
2009/10	7985	5461	6	5	8	20	13485	-4.7%
2010/11	8258	5324	5	5	8	24	13624	1.0%
2011/12	8408	5730	5	5	7	26	14182	4.1%
2012/13	8566	5951	6	5	7	26	14560	2.7%
2013/14	8762	6284	6	5	7	0	15062	3.4%
2014/15	8937	6306	6	5	6	0	15259	1.3%
2015/16	9113	6136	6	5	6	0	15265	0.0%
2016/17	9287	6191	6	5	6	0	15494	1.5%
2017/18	9456	6276	6	5	5	0	15747	1.6%
2018/19	9611	6241	6	5	5	0	15867	0.8%
2019/20	9763	6391	6	5	5	0	16169	1.9%
2020/21	9914	6551	6	5	5	0	16480	1.9%
2021/22	10063	6651	6	5	4	0	16729	1.5%
2022/23	10211	6751	6	5	4	0	16977	1.5%
2023/24	10357	6851	6	5	4	0	17223	1.4%
2024/25	10502	6951	6	5	4	0	17467	1.4%
2025/26	10643	7051	6	5	4	0	17709	1.4%
2026/27	10783	7151	6	5	3	0	17948	1.4%
2027/28	10921	7251	6	5	3	0	18186	1.3%
2028/29	11052	7351	6	5	3	0	18417	1.3%
2029/30	11181	7451	6	5	3	0	18646	1.2%
2030/31	11308	7551	6	5	3	0	18873	1.2%

Plug-In Electric Vehicles

Figure 5 - Plug-In Electric Vehicles



This forecast includes an estimate of the future adoption of Plug-In Electric Vehicles (PEVs). This is made up of two types: (1) Plug-In Hybrid Electric Vehicles (PHEVs) that run on an electric battery but use an internal combustion engine (ICE) when the electricity runs low. An example is the Chevrolet Volt. (2) Battery Electric Vehicles (BEVs) that run only on electric battery power, such as the Nissan Leaf. At the beginning of 2011, there were fewer than 30 PEVs in Manitoba.

The forecast of Plug-In Electric Vehicles does not include Hybrid Electric Vehicles (HEVs). These have an internal combustion engine as well as a battery and electric motor to drive the wheels, such as the Toyota Prius. The HEV battery can be charged with power from the ICE and through regenerative breaking. It is not charged by plugging in and therefore does not affect electricity consumption in Manitoba. At the beginning of 2011, there were about 3,000 HEVs in Manitoba that make up about 0.4% of all registered vehicles.

There are many challenges that need to be overcome before PEVs start to become a significant player in the automotive industry. Large auto makers have only just started producing a limited number of PEVs. Their introduction will be gradual, and their adoption will take time. The consumer has to pay a premium price for the technology. For example, the Chevrolet Volt manufacturer suggested retail price is $41,500 CAD compared to $19,500 CAD for the Chevy Cruze Eco, which is the same size as the Volt.

The high purchase price is the major disincentive. Even with their lower fuel cost, total cost of ownership is not yet lower than conventional vehicles. It will take time before technological improvements and mass production bring the PEV price down to be competitive with conventional vehicles. Their primary benefit is reduced fuel cost, but in that aspect they are in competition with Hybrid Electric Vehicles and newer high-efficient ICE vehicles. Government

incentives may be needed to help stem part of this price gap to encourage purchases. But Governments will also have to determine where they will recover the lost gasoline taxes. If the price of gasoline at the pumps rises significantly relative to electricity, more people will consider electric vehicles.

Technological improvements are needed before mass adoption is possible. The batteries today are expensive, large and take a long time to charge: 6 to 12 hours at 120 volts, and 4 hours at 240 volts. In Manitoba, 120 volt outlets are commonplace due to the requirement to plug in our cars' block heaters during our cold winters. High voltage charging stations would be needed if drivers are going to desire the same quick-fill convenience that they now have from gas filling stations. But ICE vehicles currently cannot be filled at home, and many PEV owners may find that the convenience and cost savings of plugging in at home to be worth the longer refill time.

Other Manitoba-related concerns about PEVs and more specifically BEV's are how will they perform in cold weather, how will they keep the passengers warm and the windows defrosted, and how will extreme weather affect battery capacity.

In April 2011, the Manitoba Government introduced their *Electric Vehicle Road Map*. Under the Road Map, the Province will promote partnerships and education to help speed up the adoption of electric vehicles in Manitoba. They also plan to purchase PEVs as part of their government vehicle fleet.

Canadian dealers will begin to have PEVs in their showrooms over the next few years. Customer awareness and automobile availability are the first steps needed to begin the process of marketplace adoption. Manitoba will be set back somewhat as some dealers, notably Nissan, will not introduce their PEVs here until the larger markets in Canada (Ontario, Quebec, BC, and Alberta) are first explored.

The Obama administration in the United States intends to lead the initiative for PEVs in North America. In his State of the Union address in January 2011, the President expressed his desire to have 1 million electric vehicles on the road by 2015.[1] Most analysts consider this very ambitious. J.D. Power & Associates stated in their November 2010 report that they expect

[1] "Obama promises to have 1 mln electric vehicles by 2015" - IBTimes, Jan 27, 2011

global sales of HEVs and BEVs to total 5.2 million units in 2020, or just 7.3% of the 70.9 million vehicles expected to be sold worldwide that year.[2]

Predictions for Canada are less optimistic. In September 2010, David Mondragon, the CEO of Ford Canada predicted that the vast majority of drivers will continue to opt for gas-powered cars and trucks along with hybrids. David Cole, chairman at the U.S. Center for Automotive Research supported Mondragon's projection that only one or two per cent of drivers are going to make the switch to pure battery-powered vehicles by the end of the next decade.[3]

The average PEV is expected to use 2,560 kW.h/year[4] which is less than the annual energy use of an electric water heater. There are different opinions on average peak contribution per vehicle, but an acceptable expectation is that peak load use will approximately be equal to non-peak use. A load factor of 91% was chosen to derive the load coincident to Manitoba Hydro's system peak on a cold winter day.

This forecast assumes that electric vehicles will slowly be adopted in Manitoba. The adoption rate was modeled after the Manitoba adoption rate of Hybrid Electric Vehicles. The forecast for 2020/21 is that 1.8% (1,010) of vehicles sold will be PEVs rising to 15.5% (9,780) by 2030/31.

The rise in sales translates to 0.5% (4,140) of vehicles on the road in 2021 being PEVs, consuming 13 GW.h during the year and 2 MW at winter peak. In 2031, PEVs are forecast to be 4.5% (42,920) of all Manitoba vehicles, and will consume 110 GW.h during the year and 14 MW at winter peak. At 6 p.m. when the most PEVs will likely be plugged in, they would use 22 MW.

The estimate for electric vehicles is included in the Electric Load Forecast. Two thirds of the forecast load is assumed to be residential and is included in the Residential forecast. The remaining third is assumed to be commercial and is included in the General Service Mass Market forecast as a non-demand load.

[2] "Drive Green 2020: More Hope than Reality?" - A Special Report by J.D. Power and Associates, Nov 2010
[3] "Drivers won't show love for electric cars any time this decade: Ford Canada CEO" - Winnipeg Free Press, Sept 9, 2010
[4] Calculated from Table 10, page 25, "Are We Ready to Step Off the Gas? Preparing for the Impacts of Alternative Fuel Vehicles" - April 2011, The Conference Board of Canada

Table 12 - Plug-In Electric Vehicles

PLUG-IN ELECTRIC VEHICLE FORECAST History and Forecast 2000/01 - 2030/31								
Fiscal Year	New Vehicles Purchased	New PEV Purchased	New PEV %	Total Vehicles	Total PEV	Total % PEV	Cumul Total PEV GW.h	Cumul Total PEV MW
2000/01	-	-	0.0%	615,620	-		0	0
2001/02	41,807	-	0.0%	627,110	-		0	0
2002/03	42,574	-	0.0%	638,610	-		0	0
2003/04	43,340	-	0.0%	650,100	-		0	0
2004/05	44,107	-	0.0%	661,600	-		0	0
2005/06	44,873	-	0.0%	673,090	-		0	0
2006/07	45,639	-	0.0%	684,590	-		0	0
2007/08	46,405	-	0.0%	696,080	-		0	0
2008/09	47,172	-	0.0%	707,580	-		0	0
2009/10	47,938	-	0.0%	719,070	-		0	0
2010/11	48,705	-	0.0%	730,570	30	0.0%	0	0
2011/12	49,471	100	0.2%	742,060	130	0.0%	0	0
2012/13	50,237	310	0.6%	753,560	440	0.1%	1	0
2013/14	51,003	380	0.8%	765,050	820	0.1%	2	0
2014/15	51,770	410	0.8%	776,550	1,230	0.2%	3	0
2015/16	52,536	440	0.8%	788,040	1,670	0.2%	4	1
2016/17	53,302	480	0.9%	799,530	2,150	0.3%	6	1
2017/18	54,069	530	1.0%	811,030	2,680	0.3%	7	1
2018/19	54,835	660	1.2%	822,520	3,330	0.4%	9	1
2019/20	55,601	820	1.5%	834,020	4,140	0.5%	11	1
2020/21	56,367	1,010	1.8%	845,510	5,130	0.6%	13	2
2021/22	57,134	1,290	2.3%	857,010	6,370	0.7%	16	2
2022/23	57,900	1,610	2.8%	868,500	7,900	0.9%	20	3
2023/24	58,667	2,010	3.5%	880,000	9,790	1.1%	25	3
2024/25	59,433	2,540	4.3%	891,490	12,130	1.4%	31	4
2025/26	60,199	3,180	5.4%	902,990	15,010	1.7%	38	5
2026/27	60,965	4,000	6.6%	914,480	18,560	2.0%	48	6
2027/28	61,732	5,030	8.3%	925,980	22,940	2.5%	59	7
2028/29	62,498	6,280	10.2%	937,470	28,300	3.0%	72	9
2029/30	63,265	7,850	12.6%	948,970	34,880	3.7%	89	11
2030/31	64,031	9,780	15.5%	960,460	42,920	4.5%	110	14

This table provides the estimate of the number of new vehicles and total vehicles each year in Manitoba, as well as the corresponding numbers for Plug-In Electric Vehicles. The number of retired vehicles each year is not shown. PEV MW is at Hydro's system peak.

Quotes from some of the References used for the PEV forecast:

"One key reason that mass commercialization of PEVs may proceed slowly over the next decade is that mainstream retail purchasers of new vehicles differ from the relatively small number of enthusiastic “early adopters.” Mainstream car buyers are careful about investing in new technologies that are not fully understood. There are a variety of uncertainties about exactly how much money will be saved by PEVs, how reliable and safe the batteries will be, how convenient and costly it will be to recharge a PEV, how easy it will be to have the vehicle serviced, and how difficult it will be to resell the vehicle. Although proponents of PEVs are making progress in resolving these uncertainties, consumers will ask many questions before purchasing a PEV and will wait to hear from others who choose to experiment with a PEV."

Plug-in Electric Vehicles: A Practical Plan for Progress.
Feb 2011, School of Public and Environmental Affairs at Indiana University
http://www.indiana.edu/~spea/pubs/TEP_combined.pdf

"How the market for alternative-energy vehicles evolves thereafter depends on various inputs. To be sure, in battery-based technologies, much work needs to be done in the areas of battery life expectancy and driving range; cost reductions in battery production (and, by extension, a decrease in the retail price of hybrid-powered and battery-powered vehicles); infrastructure development to support a mass vehicle fleet that operates on electricity; and consumer acceptance of a technology that is not currently well understood or completely trusted."

"Given the challenges that HEVs and BEVs face, and based on J.D. Power's research in automotive markets around the world, it is unlikely that global demand will reach the levels that have been widely predicted in the world".

Drive Green 2020: More Hope than Reality?
Nov 2010, A Special Report by J.D. Power and Associates
http://yelnick.typepad.com/files/drivegreen2020_102610.pdf

"Though EVs are considered better than ICEs in a number of respects ... what will truly shape EV adoption over the next decade?

- EV Technology: Range,
- EV Technology: Charge Time & Convenience,
- Purchase Cost,
- Operating Cost,
- Total Cost of Ownership"

Gaining Traction: Will Consumers Ride the Electric Vehicle Wave?
Feb 10, 2011, Deloitte, Canadian Results
http://www.vancouversun.com/pdf/CanadaEVfindingsFeb10.pdf

"Take-up of these vehicles has been limited, due to the high purchase price compared with conventional vehicles and the lack of supporting infrastructure. Widespread take-up will happen only when an improved product with superior environmental performance is offered at a comparable cost with minimal additional inconvenience."

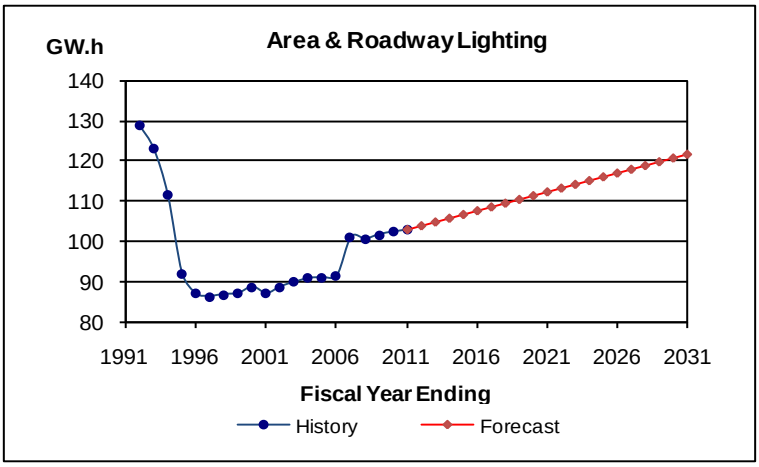
Are We Ready to Step Off the Gas? Preparing for the Impacts of Alternative Fuel Vehicles
April 2011, The Conference Board of Canada
http://www.conferenceboard.ca/e-Library/document.aspx?did=4133

• this transition will not happen overnight
• we can't control the pace at which electric vehicles are made available in the marketplace

Manitoba's Electric Vehicle Road Map
April 2011, Manitoba Department of Innovation, Energy and Mines
http://www.gov.mb.ca/stem/energy/pdfs/elec_vehicle_road_map.pdf

Area & Roadway Lighting

Figure 6 - Area & Roadway Lighting



The Area and Roadway Lighting sector represents 0.5% of all sales within Manitoba. This sector includes electricity sales for the Sentinel Lighting and Street Lighting rate groups. Sentinel Lighting is an outdoor lighting service where units are available either as rentals to an existing metered service or on an unmetered, flat rate basis. Street Lighting includes all roadway lighting in Manitoba. Energy-efficient street lighting initiatives caused the significant drop in usage in the mid 1990's. In 2006, a readjustment of the rate classes moved some flat rate General Service meters into the Lighting sector. Only Street Lights and flat rate GS meters count as customers.

The Area and Roadway Lighting sector is forecast to increase from 103 GW.h in 2010/11 to 121 GW.h by 2030/31 at an average growth rate of 1 GW.h or 0.8% per year.

Table 13 - Area & Roadway Lighting

AREA & ROADWAY LIGHTING (GW.h) HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Sales	Weather Adjust	Adjusted Sales	Fiscal Year	Forecast Sales
1991/92	129	0	129	2011/12	104
1992/93	123	0	123	2012/13	105
1993/94	111	0	111	2013/14	106
1994/95	92	0	92	2014/15	107
1995/96	87	0	87	2015/16	107
1996/97	86	0	86	2016/17	108
1997/98	87	0	87	2017/18	109
1998/99	87	0	87	2018/19	110
1999/00	89	0	89	2019/20	111
2000/01	87	0	87	2020/21	112
2001/02	89	0	89	2021/22	113
2002/03	90	0	90	2022/23	114
2003/04	91	0	91	2023/24	115
2004/05	91	0	91	2024/25	116
2005/06	91	0	91	2025/26	117
2006/07	101	0	101	2026/27	118
2007/08	101	0	101	2027/28	119
2008/09	102	0	102	2028/29	120
2009/10	102	0	102	2029/30	121
2010/11	103	0	103	2030/31	121

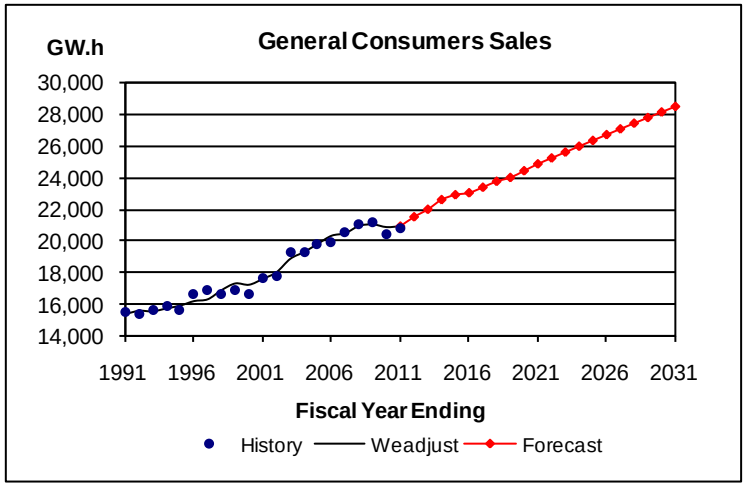
AREA AND ROADWAY LIGHTING
History and Forecast
2000/01 - 2030/31

Fiscal	Sentinal Flat Rates		Sentinal Rentals		Street Lighting		Total Lighting	
Year	(Services)	(GW.h)	(Services)	(GW.h)	(Custs)	(GW.h)	(Custs)	(GW.h)
2000/01	18968	10	5475	0	751	77	751	87
2001/02	19166	10	5468	0	756	79	756	89
2002/03	19446	10	5477	0	755	80	755	90
2003/04	19527	10	5505	0	757	81	757	91
2004/05	19648	10	5519	0	759	81	759	91
2005/06	19652	10	7826	0	793	81	793	91
2006/07	18669	11	23994	0	1129	90	1129	101
2007/08	18947	11	24272	0	1142	90	1142	101
2008/09	19228	11	24542	0	1175	91	1175	102
2009/10	19539	11	24886	0	1191	91	1191	102
2010/11	19835	11	25216	0	1184	92	1184	103
2011/12	20098	11	25497	0	1158	92	1158	104
2012/13	20394	12	25807	0	1166	93	1166	105
2013/14	20690	12	26117	0	1175	94	1175	106
2014/15	20986	12	26427	0	1185	95	1185	107
2015/16	21282	12	26737	0	1195	95	1195	107
2016/17	21578	12	27047	0	1204	96	1204	108
2017/18	21874	12	27357	0	1214	97	1214	109
2018/19	22170	13	27667	0	1224	98	1224	110
2019/20	22466	13	27977	0	1233	98	1233	111
2020/21	22762	13	28287	0	1243	99	1243	112
2021/22	23058	13	28597	0	1252	100	1252	113
2022/23	23354	13	28907	0	1262	101	1262	114
2023/24	23650	13	29217	0	1272	101	1272	115
2024/25	23946	14	29527	0	1281	102	1281	116
2025/26	24242	14	29837	0	1291	103	1291	117
2026/27	24538	14	30147	0	1301	104	1301	118
2027/28	24834	14	30457	0	1310	105	1310	119
2028/29	25130	14	30767	0	1320	105	1320	120
2029/30	25426	14	31077	0	1329	106	1329	121
2030/31	25722	15	31387	0	1339	107	1339	121

Total General Consumers Sales

Figure 7 - General Consumers Sales

General Consumers Sales includes sales to all of Manitoba Hydro's individually billed customers, but excludes export sales. This includes the total of all sales from the Residential, General Service and Lighting sectors. The General Service sector makes up about two-thirds, the Residential sector makes up about one-third and the Lighting group is only 0.5% of all sales.



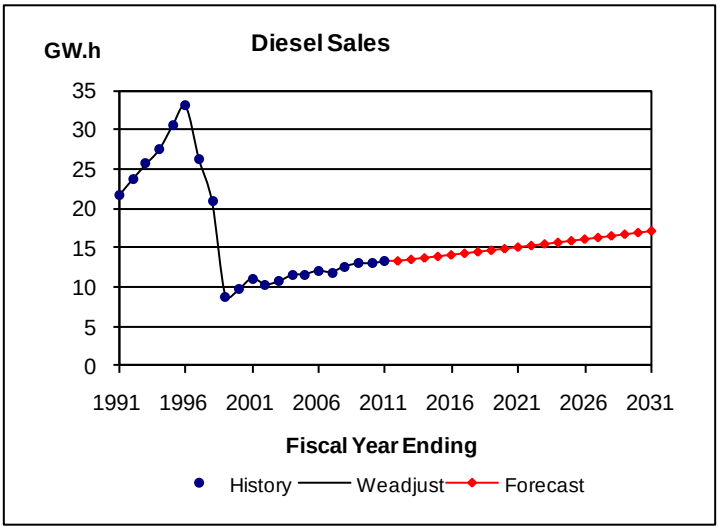
Weather adjusted General Consumers Sales has grown from 15,528 GW.h in 1991/92 to 20,918 GW.h in 2010/11 at an average growth of 284 GW.h or 1.6% per year. It is forecast to grow to 28,528 GW.h by 2030/31 at an average growth of 381 GW.h or 1.6% per year.

Table 15 - General Consumers Sales

GENERAL CONSUMERS SALES (GW.h) HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Sales	Weather Adjust	Adjusted Sales	Fiscal Year	Forecast Sales
1991/92	15397	131	15528	2011/12	21513
1992/93	15577	-78	15498	2012/13	21991
1993/94	15870	-187	15684	2013/14	22605
1994/95	15600	266	15866	2014/15	22916
1995/96	16654	-504	16149	2015/16	23040
1996/97	16851	-585	16267	2016/17	23391
1997/98	16681	167	16848	2017/18	23768
1998/99	16929	344	17273	2018/19	24012
1999/00	16696	495	17191	2019/20	24440
2000/01	17590	-29	17561	2020/21	24877
2001/02	17805	188	17993	2021/22	25252
2002/03	19246	-403	18843	2022/23	25626
2003/04	19280	-9	19271	2023/24	25997
2004/05	19735	62	19797	2024/25	26368
2005/06	19935	375	20309	2025/26	26735
2006/07	20510	-37	20473	2026/27	27100
2007/08	21061	-128	20934	2027/28	27464
2008/09	21210	-182	21028	2028/29	27821
2009/10	20486	371	20858	2029/30	28175
2010/11	20786	131	20918	2030/31	28528

Diesel Sales

Figure 8 - Diesel Sales



There are four diesel sites in Manitoba: Brochet, Lac Brochet, Tadoule Lake and Shamattawa. Diesel sales are included in General Consumers Sales, but are not part of the integrated system.

Between 1997 and 1999, eleven diesel communities were connected to the integrated system. Between 1991 and 2001, the four sites that were to remain diesel were converted from 15 amp service to 60 amp service causing the increase in those years.

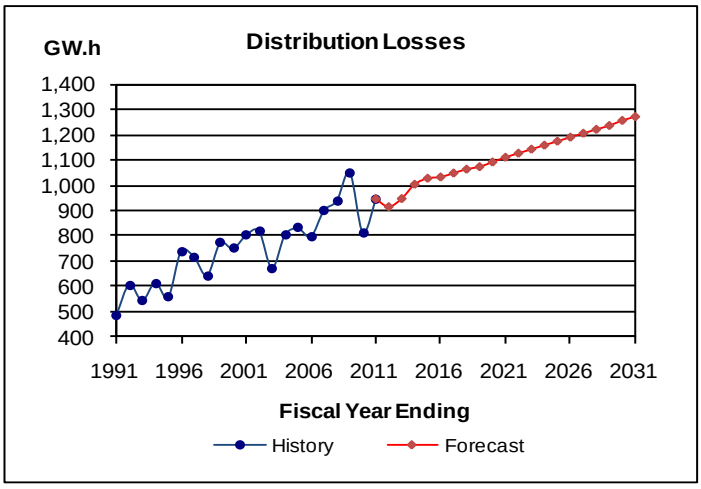
Diesel sales are subtracted from Total General Consumers Sales when comparing sales to generation. Diesel customers do not have electric heat, which requires 200 amp service, so there is no weather effect.

Table 16 - Diesel Sales

DIESEL SALES (GW.h) HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Sales	Weather Adjust	Adjusted Sales	Fiscal Year	Forecast Sales
1991/92	24	0	24	2011/12	13
1992/93	26	0	26	2012/13	13
1993/94	28	0	28	2013/14	14
1994/95	31	0	31	2014/15	14
1995/96	33	0	33	2015/16	14
1996/97	26	0	26	2016/17	14
1997/98	21	0	21	2017/18	14
1998/99	9	0	9	2018/19	15
1999/00	10	0	10	2019/20	15
2000/01	11	0	11	2020/21	15
2001/02	10	0	10	2021/22	15
2002/03	11	0	11	2022/23	15
2003/04	12	0	12	2023/24	16
2004/05	12	0	12	2024/25	16
2005/06	12	0	12	2025/26	16
2006/07	12	0	12	2026/27	16
2007/08	13	0	13	2027/28	16
2008/09	13	0	13	2028/29	17
2009/10	13	0	13	2029/30	17
2010/11	13	0	13	2030/31	17

Distribution Losses

Figure 9 - Distribution Losses



Distribution Losses are made up of the power loss between the distribution substation (Manitoba Load at Common Bus less Construction) and the customer's meter (General Consumers Sales less Diesel), as well as all other differences between what was billed and what was metered. The other differences include:

1. The offset between cycle billing (General Consumers Sales) and actual calendar month usage (Common Bus).
2. Customer Accounting adjustments,
3. Inaccuracies associated with estimated billing (including flat rate estimates),
4. The unbilled consumption of Manitoba Hydro offices, and
5. Energy lost due to theft.

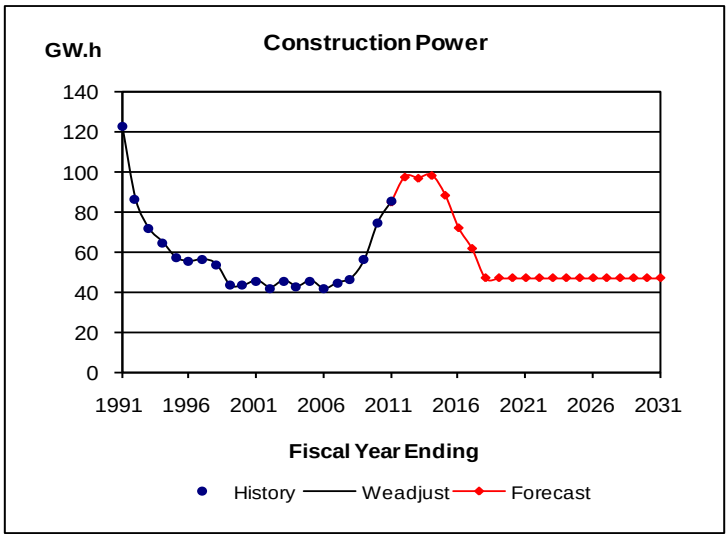
Distribution Losses are forecast in 2011/12 to be about 4.3% of the General Consumers Sales less Diesel, growing to about 4.5% by 2030/31.

Table 17 - Distribution Losses

DISTRIBUTION LOSSES (GW.h) HISTORICAL/PERCENT OF SALES/FORECAST							
Fiscal Year	Losses	Sales - Diesel	% Losses	Fiscal Year	Forecast Losses	Sales - Diesel	% Losses
1991/92	606	15373	3.9%	2011/12	916	21499	4.3%
1992/93	541	15551	3.5%	2012/13	948	21977	4.3%
1993/94	614	15843	3.9%	2013/14	1005	22591	4.4%
1994/95	556	15569	3.6%	2014/15	1029	22902	4.5%
1995/96	740	16621	4.4%	2015/16	1034	23026	4.5%
1996/97	715	16825	4.3%	2016/17	1049	23377	4.5%
1997/98	641	16660	3.8%	2017/18	1065	23754	4.5%
1998/99	771	16920	4.6%	2018/19	1075	23998	4.5%
1999/00	749	16686	4.5%	2019/20	1093	24425	4.5%
2000/01	802	17579	4.6%	2020/21	1112	24862	4.5%
2001/02	819	17794	4.6%	2021/22	1128	25236	4.5%
2002/03	671	19236	3.5%	2022/23	1144	25610	4.5%
2003/04	804	19269	4.2%	2023/24	1160	25982	4.5%
2004/05	830	19724	4.2%	2024/25	1176	26352	4.5%
2005/06	797	19923	4.0%	2025/26	1192	26719	4.5%
2006/07	900	20498	4.4%	2026/27	1207	27084	4.5%
2007/08	940	21049	4.5%	2027/28	1223	27447	4.5%
2008/09	1052	21197	5.0%	2028/29	1238	27804	4.5%
2009/10	813	20473	4.0%	2029/30	1258	28158	4.5%
2010/11	947	20773	4.6%	2030/31	1273	28511	4.5%

Construction Power

Figure 10 - Construction Power



Construction Power represents the energy used by Manitoba Hydro and its contractors in the construction of major capital works such as generating stations, converter stations and major transmission lines. Construction Power also includes Station Service until a plant is commissioned, as well as 48 GW.h of heating load at the Gillam, Limestone and Kettle town sites. Construction fell after the Limestone development was completed in the 90's.

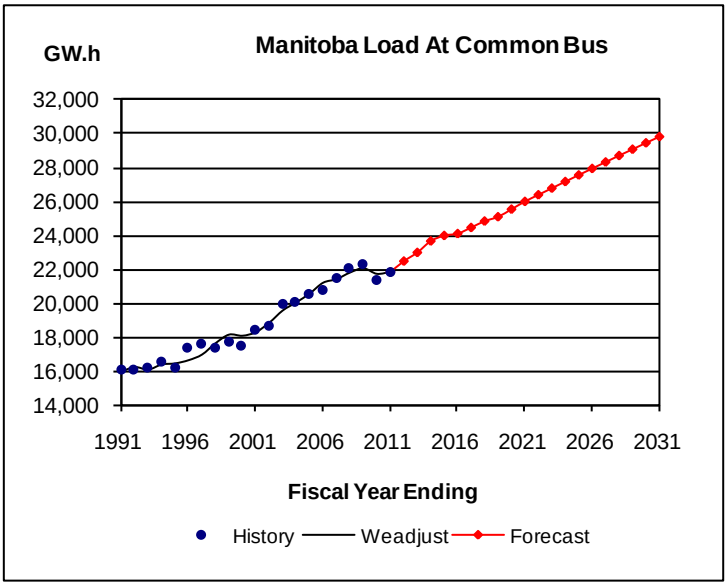
The Construction Power forecast includes: (1) the Wuskwatim generating station that is now underway with an in-service date during 2011/12 and final construction expected to be completed in 2014/15, (2) the Pointe Du Bois spillway replacement that will take place from July 2012 to July 2016 requiring 5 MV.A at 50% utilization, (3) Keewatinoow Converter Station retrofit from October 2012 to December 2017. Construction Power does not include construction power estimates for any non-committed sites (e.g. Conawapa and Keeyask).

Table 18 - Construction Power

CONSTRUCTION POWER (GW.h) HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Usage	Weather Adjust	Adjusted Usage	Fiscal Year	Forecast Usage
1991/92	86	0	86	2011/12	98
1992/93	72	0	72	2012/13	97
1993/94	65	0	65	2013/14	99
1994/95	57	0	57	2014/15	89
1995/96	55	0	55	2015/16	72
1996/97	56	0	56	2016/17	62
1997/98	54	0	54	2017/18	47
1998/99	43	0	43	2018/19	47
1999/00	43	0	43	2019/20	47
2000/01	46	0	46	2020/21	47
2001/02	42	0	42	2021/22	47
2002/03	46	0	46	2022/23	47
2003/04	43	0	43	2023/24	47
2004/05	46	0	46	2024/25	47
2005/06	42	0	42	2025/26	47
2006/07	45	0	45	2026/27	47
2007/08	47	0	47	2027/28	47
2008/09	56	0	56	2028/29	47
2009/10	75	0	75	2029/30	47
2010/11	85	0	85	2030/31	47

Manitoba Load at Common Bus

Figure 11 - Manitoba Load at Common Bus



Manitoba Load at Common Bus is the total load measured from all the distribution points (i.e. substations) within Manitoba. It includes all energy supplied to General Consumers Sales customers, Construction Power plus associated Distribution Losses, but excludes Diesel customers, Transmission Losses and Station Service.

Common Bus is metered and totaled to correspond exactly to each calendar month. Weather adjustment is done on a calendar month basis.

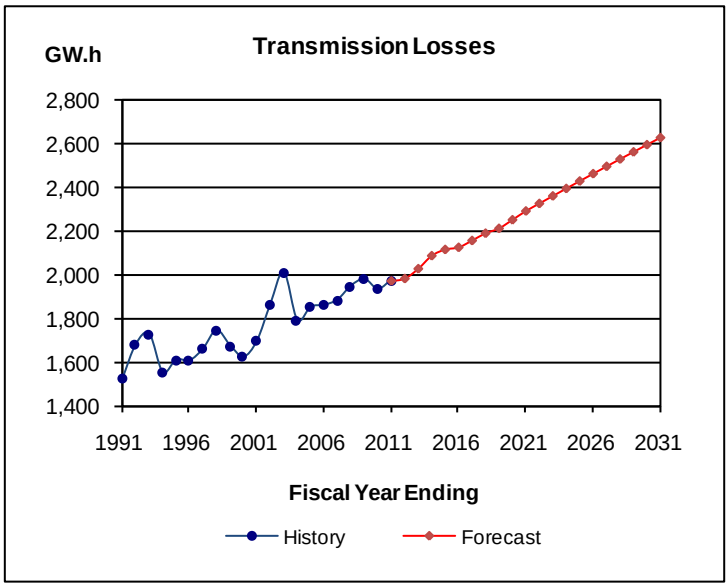
Weather adjusted Common Bus has grown from 16,210 GW.h in 1991/92 to 21,876 GW.h in 2010/11 at an average growth of 298 GW.h or 1.6% per year. It is forecast to grow to 29,831 GW.h by 2030/31 at an average growth of 398 GW.h or 1.6% per year.

Table 19 - Manitoba Load at Common Bus

MANITOBA LOAD AT COMMON BUS (GW.h) HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Energy	Weather Adjust	Adjusted Energy	Fiscal Year	Forecast Energy
1991/92	16067	143	16210	2011/12	22513
1992/93	16166	-108	16057	2012/13	23022
1993/94	16523	-161	16362	2013/14	23695
1994/95	16185	241	16426	2014/15	24019
1995/96	17418	-801	16617	2015/16	24132
1996/97	17590	-636	16954	2016/17	24488
1997/98	17350	275	17625	2017/18	24866
1998/99	17722	414	18136	2018/19	25120
1999/00	17479	592	18070	2019/20	25565
2000/01	18428	-145	18283	2020/21	26021
2001/02	18655	192	18847	2021/22	26412
2002/03	19953	-379	19574	2022/23	26802
2003/04	20116	-62	20054	2023/24	27189
2004/05	20600	-20	20580	2024/25	27575
2005/06	20761	461	21222	2025/26	27958
2006/07	21442	-6	21436	2026/27	28338
2007/08	22036	-207	21829	2027/28	28717
2008/09	22305	-225	22080	2028/29	29089
2009/10	21361	388	21749	2029/30	29463
2010/11	21806	70	21876	2030/31	29831

Transmission Losses

Figure 12 - Transmission Losses



Transmission Losses are the amount of energy lost while delivering power from the generation stations to all of the distribution substations that make up Common Bus. Transmission Losses only contains losses associated with supplying Manitoba customers. Losses attributable to exports and the gains attributable to imports are excluded. Transmission Losses are substantial because most of the northern generation is transmitted to southern distribution points 900 kilometers away. Transmission Losses vary significantly depending on water conditions, system configuration, outages and the magnitude of the load. Losses were up significantly in 2002/03 due to two High Voltage Direct Current (HVDC) transformer failures.

Transmission Losses are forecast to be about 8.8% of the Manitoba Load at Common Bus.

Table 20 - Transmission Losses

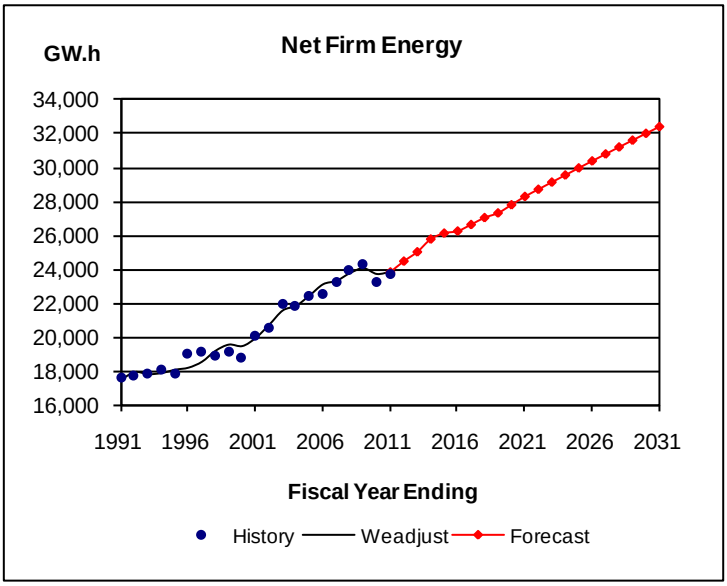
TRANSMISSION LOSSES (GW.h) HISTORICAL/PERCENT OF COMMON BUS/FORECAST							
Fiscal Year	Losses	Common Bus	% Losses	Fiscal Year	Forecast Losses	Common Bus	% Losses
1991/92	1680	16067	10.5%	2011/12	1988	22513	8.8%
1992/93	1728	16166	10.7%	2012/13	2033	23022	8.8%
1993/94	1552	16523	9.4%	2013/14	2093	23695	8.8%
1994/95	1609	16185	9.9%	2014/15	2122	24019	8.8%
1995/96	1606	17418	9.2%	2015/16	2131	24132	8.8%
1996/97	1660	17590	9.4%	2016/17	2163	24488	8.8%
1997/98	1745	17350	10.1%	2017/18	2196	24866	8.8%
1998/99	1675	17722	9.5%	2018/19	2218	25120	8.8%
1999/00	1623	17479	9.3%	2019/20	2258	25565	8.8%
2000/01	1696	18428	9.2%	2020/21	2298	26021	8.8%
2001/02	1864	18655	10.0%	2021/22	2332	26412	8.8%
2002/03	2012	19953	10.1%	2022/23	2367	26802	8.8%
2003/04	1792	20116	8.9%	2023/24	2401	27189	8.8%
2004/05	1852	20600	9.0%	2024/25	2435	27575	8.8%
2005/06	1860	20761	9.0%	2025/26	2469	27958	8.8%
2006/07	1885	21442	8.8%	2026/27	2503	28338	8.8%
2007/08	1949	22036	8.8%	2027/28	2536	28717	8.8%
2008/09	1979	22305	8.9%	2028/29	2569	29089	8.8%
2009/10	1934	21361	9.1%	2029/30	2602	29463	8.8%
2010/11	1977	21806	9.1%	2030/31	2634	29831	8.8%

Net Firm Energy

Figure 13 - Net Firm Energy

Net Firm Energy is the energy required to serve Manitoba Hydro's customers on the Integrated System. It excludes exports, interruptible (non-firm) loads, Diesel customers and Station Service.

Net Firm Energy has grown steadily during the past twenty years, except for the economic slowdown in the early 1990's and more recently in 2009.



Weather adjusted Net Firm Energy has grown from 17,901 GW.h in 1991/92 to 23,833 GW.h in 2010/11 at an average growth of 312 GW.h or 1.5% per year. It is forecast to grow to 32,465 GW.h by 2030/31 at an average growth of 432 GW.h or 1.6% per year.

Table 21 - Net Firm Energy

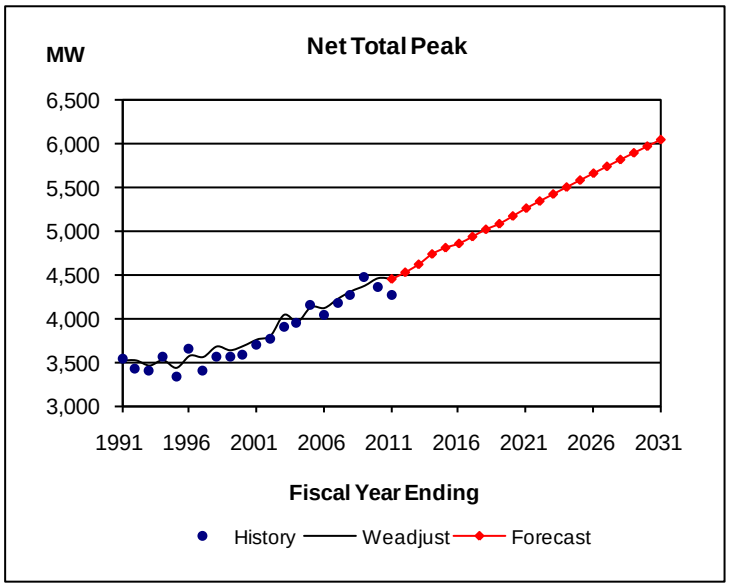
NET FIRM ENERGY (GW.h)
HISTORICAL/WEATHER ADJUSTMENT/FORECAST

Fiscal Year	Energy	Weather Adjust	Adjusted Energy	Fiscal Year	Forecast Energy
1991/92	17748	153	17901	2011/12	24475
1992/93	17894	-124	17770	2012/13	25030
1993/94	18048	-207	17842	2013/14	25787
1994/95	17784	251	18035	2014/15	26141
1995/96	19000	-841	18159	2015/16	26264
1996/97	19173	-662	18511	2016/17	26651
1997/98	18872	282	19155	2017/18	27062
1998/99	19095	425	19521	2018/19	27338
1999/00	18804	630	19434	2019/20	27823
2000/01	20075	-153	19922	2020/21	28319
2001/02	20494	203	20697	2021/22	28744
2002/03	21940	-404	21536	2022/23	29169
2003/04	21890	-74	21816	2023/24	29590
2004/05	22426	1	22427	2024/25	30011
2005/06	22598	487	23085	2025/26	30427
2006/07	23305	-14	23291	2026/27	30841
2007/08	23961	-216	23745	2027/28	31253
2008/09	24262	-230	24032	2028/29	31658
2009/10	23275	416	23691	2029/30	32065
2010/11	23758	75	23833	2030/31	32465

MONTHLY NET FIRM ENERGY (GW.h) History and Forecast 2000/01 - 2030/31													
Fiscal Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
2000/01	1504	1425	1375	1424	1444	1371	1526	1807	2263	2068	1987	1881	20075
2001/02	1573	1486	1432	1499	1567	1419	1627	1728	2060	2163	1846	2094	20494
2002/03	1711	1615	1528	1603	1545	1527	1800	1950	2132	2321	2124	2084	21940
2003/04	1641	1568	1510	1562	1672	1536	1675	2006	2180	2456	2071	2013	21890
2004/05	1687	1673	1537	1571	1567	1565	1781	1936	2389	2518	2080	2122	22426
2005/06	1714	1687	1650	1724	1639	1600	1769	2030	2282	2223	2154	2124	22598
2006/07	1702	1681	1673	1816	1737	1613	1857	2076	2286	2439	2285	2140	23305
2007/08	1826	1688	1654	1812	1718	1643	1827	2093	2471	2566	2407	2255	23961
2008/09	1868	1727	1655	1721	1777	1674	1864	2139	2632	2681	2211	2316	24262
2009/10	1849	1733	1663	1660	1637	1665	1877	1921	2541	2509	2200	2020	23275
2010/11	1689	1683	1603	1709	1691	1630	1769	2116	2547	2665	2308	2349	23758
2011/12	1932	1823	1694	1769	1753	1707	1932	2191	2498	2609	2281	2286	24475
2012/13	1976	1866	1734	1811	1795	1748	1978	2240	2551	2665	2329	2336	25030
2013/14	2037	1926	1790	1867	1851	1803	2040	2306	2624	2740	2397	2406	25787
2014/15	2065	1952	1813	1892	1875	1827	2068	2339	2662	2780	2431	2439	26141
2015/16	2074	1958	1818	1896	1880	1832	2075	2352	2680	2799	2447	2453	26264
2016/17	2104	1986	1844	1923	1907	1858	2106	2387	2720	2841	2484	2490	26651
2017/18	2137	2016	1872	1953	1936	1887	2139	2424	2762	2886	2523	2529	27062
2018/19	2158	2035	1889	1970	1953	1904	2160	2450	2794	2919	2551	2556	27338
2019/20	2197	2072	1923	2005	1988	1938	2199	2493	2842	2969	2595	2601	27823
2020/21	2236	2110	1957	2041	2024	1974	2239	2537	2892	3021	2641	2647	28319
2021/22	2270	2141	1987	2072	2054	2003	2273	2575	2935	3066	2680	2687	28744
2022/23	2304	2173	2016	2102	2084	2033	2307	2614	2979	3112	2720	2726	29169
2023/24	2337	2204	2045	2132	2114	2062	2340	2651	3022	3157	2759	2766	29590
2024/25	2370	2236	2074	2162	2144	2092	2374	2689	3065	3201	2799	2805	30011
2025/26	2403	2267	2102	2192	2173	2121	2407	2727	3107	3246	2838	2844	30427
2026/27	2436	2298	2131	2221	2203	2149	2440	2764	3149	3290	2876	2883	30841
2027/28	2469	2328	2159	2251	2232	2178	2473	2801	3192	3334	2915	2922	31253
2028/29	2501	2358	2187	2279	2261	2206	2505	2837	3233	3377	2952	2960	31658
2029/30	2533	2389	2215	2309	2290	2235	2538	2874	3275	3421	2991	2998	32065
2030/31	2565	2418	2242	2337	2318	2263	2569	2910	3316	3464	3028	3035	32465

Net Total Peak

Figure 14 - Net Total Peak



Net Total Peak is the maximum integrated (i.e. average) hourly load required to serve Manitoba Hydro's customers on the Integrated System. It excludes exports, Diesel customers and Station Service. It includes curtailable loads.

Typically, the peak occurs on a very cold winter weekday either in the morning (often from 8 a.m. to 9 a.m.) or in the afternoon, (from 5 p.m. to 6 p.m.) Electric heating contributes by placing the peak on one of the coldest days, whereas the operation or lack thereof of large industrials often makes the difference as to the specific day and peak hour.

Weather adjusted Net Total Peak has grown from 3,513 MW in 1991/92 to 4,453 MW in 2010/11 at an average growth of 49 MW or 1.3% per year. It is forecast to grow to 6,054 MW or 1.5% per year by 2030/31.

Table 23 – Net Total Peak

NET TOTAL PEAK (MW) HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Peak	Weather Adjust	Adjusted Peak	Fiscal Year	Forecast Peak
1991/92	3435	78	3513	2011/12	4530
1992/93	3404	50	3454	2012/13	4622
1993/94	3567	-51	3516	2013/14	4740
1994/95	3342	85	3427	2014/15	4813
1995/96	3649	-81	3568	2015/16	4861
1996/97	3408	145	3553	2016/17	4940
1997/98	3573	101	3674	2017/18	5023
1998/99	3572	58	3630	2018/19	5088
1999/00	3588	94	3682	2019/20	5176
2000/01	3706	49	3755	2020/21	5266
2001/02	3759	40	3799	2021/22	5347
2002/03	3915	124	4039	2022/23	5428
2003/04	3958	2	3960	2023/24	5508
2004/05	4169	-40	4129	2024/25	5588
2005/06	4054	64	4118	2025/26	5668
2006/07	4183	41	4224	2026/27	5746
2007/08	4273	39	4312	2027/28	5824
2008/09	4477	-101	4376	2028/29	5901
2009/10	4359	103	4462	2029/30	5978
2010/11	4261	192	4453	2030/31	6054

Peak load is measured and recorded differently than energy data. The system load at every hour is calculated by System Operations as:

Hourly Net Total Peak (t)
= Hourly Total Generation (t)
- Hourly Metered Exports (t) + Hourly Metered Imports (t)
- Losses Associated with Exports (t) + Gains Associated with Imports (t)
+ Curtailments (t)

Generating station data is metered as well as export and import data.

Losses for exports and gains for imports are only known on a monthly energy basis. The hourly value is obtained by using the ratio of exports/imports for the hour to the total exports/imports for the month and applying that to the total metered loss/gain for the month. The remaining difference between the balance of the load and Common Bus is taken as the Transmission Losses associated with Manitoba load.

Curtailments for individual customers are calculated as the difference between what the customer would have used if not curtailed versus what they did use. This is not the same as the calculation used for billing.

Annual Peak

The forecast annual peak is higher than the maximum of the monthly peaks. This is due to the peak being possible in any of the winter months and must be higher than the peak of the other months. For studies requiring yearly data, the annual peak should be used.

16 Hour Peak

The peaks in this document are integrated hourly peaks. For some studies and analysis of avoided cost or DSM savings, an estimate of the average peak during onpeak hours (from 6 a.m. to 10 p.m.) may be desired. To convert hourly peak to 16 hour peak, use the following:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
94.4%	94.9%	95.8%	96.0%	96.3%	96.0%	96.6%	95.6%	95.8%	96.6%	95.6%	95.5%	94.8%

MONTHLY NET TOTAL PEAK (MW)
History and Forecast
2000/01 - 2030/31

Fiscal Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Annual
2000/01	2751	2465	2455	2609	2537	2405	2591	3091	3637	3356	3506	3036	3637
2001/02	2735	2478	2631	2711	2775	2602	2780	3211	3398	3760	3583	3437	3760
2002/03	3053	2794	2763	2892	2721	2680	3021	3368	3634	3813	3916	3784	3916
2003/04	3213	2569	2853	2861	2905	2885	2968	3442	3760	3959	3713	3442	3959
2004/05	2850	2757	2702	2882	2622	2733	2958	3571	4025	4169	3810	3548	4169
2005/06	2937	2828	3033	3026	3039	2821	2932	3644	3883	3606	4052	3474	4052
2006/07	3075	2810	3003	3127	3025	2938	3200	3764	3983	4184	4166	3817	4184
2007/08	3466	2718	3027	3279	3017	2768	2967	3968	4049	4274	4255	4066	4274
2008/09	3197	2878	2945	2905	3093	2716	3140	3781	4396	4477	4170	4199	4477
2009/10	3174	2919	2990	2747	2922	2972	3038	3269	4359	4231	4069	4212	4359
2010/11	2888	2828	2794	2982	3155	2698	3039	3905	4171	4261	4225	4144	4261
2011/12	3417	3094	2937	2957	3002	2782	2983	3864	4288	4489	4294	3958	4530
2012/13	3491	3163	3000	3020	3067	2843	3050	3944	4374	4580	4382	4041	4622
2013/14	3589	3256	3085	3106	3156	2926	3141	4048	4485	4697	4496	4149	4740
2014/15	3641	3302	3125	3147	3197	2964	3186	4107	4552	4769	4564	4212	4813
2015/16	3669	3323	3141	3162	3212	2978	3205	4143	4595	4817	4609	4250	4861
2016/17	3727	3375	3187	3208	3259	3021	3255	4208	4668	4896	4684	4318	4940
2017/18	3789	3431	3236	3257	3309	3068	3309	4278	4746	4978	4763	4391	5023
2018/19	3833	3468	3268	3289	3341	3098	3345	4329	4805	5042	4823	4445	5088
2019/20	3901	3530	3324	3345	3398	3151	3405	4405	4888	5129	4908	4523	5176
2020/21	3970	3594	3382	3403	3457	3206	3467	4482	4973	5218	4994	4603	5266
2021/22	4031	3649	3431	3453	3508	3253	3520	4550	5049	5299	5071	4674	5347
2022/23	4092	3704	3481	3502	3558	3300	3574	4619	5125	5379	5148	4745	5428
2023/24	4152	3758	3530	3551	3608	3347	3627	4686	5200	5459	5224	4815	5508
2024/25	4212	3813	3579	3601	3657	3393	3680	4754	5275	5538	5300	4885	5588
2025/26	4272	3866	3628	3649	3707	3439	3733	4821	5350	5616	5375	4955	5668
2026/27	4331	3920	3676	3698	3756	3485	3785	4888	5424	5694	5450	5024	5746
2027/28	4390	3973	3725	3747	3805	3531	3837	4955	5498	5772	5524	5092	5824
2028/29	4448	4025	3773	3794	3853	3576	3888	5020	5570	5848	5598	5159	5901
2029/30	4505	4076	3820	3842	3901	3621	3939	5085	5643	5924	5670	5226	5978
2030/31	4562	4128	3867	3889	3949	3665	3990	5150	5715	5999	5742	5293	6054

Table 25 - Net Manitoba Energy and Peak

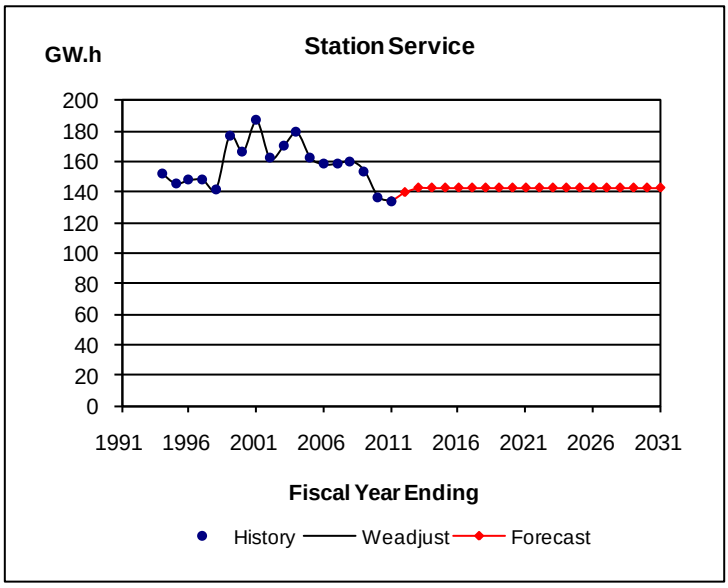
NET MANITOBA HYDRO ELECTRIC LOAD FORECAST History and Forecast 2011/12 - 2030/31					
	Net Firm Energy		Net Total Peak		Load Factor
Fiscal Year	(GW.h)	Change (%)	(MW)	Change (%)	(%)
2000/01	20075		3706		61.8%
2001/02	20494	2.1%	3759	1.4%	62.2%
2002/03	21940	7.1%	3915	4.2%	64.0%
2003/04	21890	-0.2%	3958	1.1%	63.1%
2004/05	22426	2.4%	4169	5.3%	61.4%
2005/06	22598	0.8%	4054	-2.8%	63.6%
2006/07	23305	3.1%	4183	3.2%	63.6%
2007/08	23961	2.8%	4273	2.2%	64.0%
2008/09	24262	1.3%	4477	4.8%	61.9%
2009/10	23275	-4.1%	4359	-2.6%	61.0%
2010/11	23758	2.1%	4261	-2.2%	63.6%
2011/12	24475	3.0%	4530	6.3%	61.7%
2012/13	25030	2.3%	4622	2.0%	61.8%
2013/14	25787	3.0%	4740	2.6%	62.1%
2014/15	26141	1.4%	4813	1.5%	62.0%
2015/16	26264	0.5%	4861	1.0%	61.7%
2016/17	26651	1.5%	4940	1.6%	61.6%
2017/18	27062	1.5%	5023	1.7%	61.5%
2018/19	27338	1.0%	5088	1.3%	61.3%
2019/20	27823	1.8%	5176	1.7%	61.4%
2020/21	28319	1.8%	5266	1.7%	61.4%
2021/22	28744	1.5%	5347	1.5%	61.4%
2022/23	29169	1.5%	5428	1.5%	61.3%
2023/24	29590	1.4%	5508	1.5%	61.3%
2024/25	30011	1.4%	5588	1.4%	61.3%
2025/26	30427	1.4%	5668	1.4%	61.3%
2026/27	30841	1.4%	5746	1.4%	61.3%
2027/28	31253	1.3%	5824	1.4%	61.3%
2028/29	31658	1.3%	5901	1.3%	61.2%
2029/30	32065	1.3%	5978	1.3%	61.2%
2030/31	32465	1.2%	6054	1.3%	61.2%

Load factor is calculated as the average hourly energy divided by the peak. For a given energy, a lower load factor implies a higher peak. The load factor is forecast to rise slightly to 62.1% in 2013/14 and then start shrinking to 61.2% in 2030/31.

Station Service

Figure 15 - Station Service

Station Service is the energy used by power plants to generate power and service their own load. Energy and peak estimates can either include or exclude Station Service, depending on the purpose for which they are to be used. In this document, "Net" numbers exclude Station Service and "Gross" numbers include Station Service. Station Service energy was not measured prior to 1993/94 but was then included in Transmission Losses.



Station Service energy is forecast to be 140 GW.h in 2011/12 and 143 GW.h from 2012/13 and on, when the Wuskwatim generating station has its full contribution. Station Service for non-committed sites (e.g. Conawapa and Keeyask) is not included in the forecast.

Table 26 - Station Service

STATION SERVICE (GW.h) HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Usage	Weather Adjust	Adjusted Usage	Fiscal Year	Forecast Usage
1991/92	0	0	0	2011/12	140
1992/93	0	0	0	2012/13	143
1993/94	152	0	152	2013/14	143
1994/95	146	0	146	2014/15	143
1995/96	148	0	148	2015/16	143
1996/97	148	0	148	2016/17	143
1997/98	142	0	142	2017/18	143
1998/99	177	0	177	2018/19	143
1999/00	167	0	167	2019/20	143
2000/01	187	0	187	2020/21	143
2001/02	162	0	162	2021/22	143
2002/03	170	0	170	2022/23	143
2003/04	179	0	179	2023/24	143
2004/05	163	0	163	2024/25	143
2005/06	158	0	158	2025/26	143
2006/07	159	0	159	2026/27	143
2007/08	161	0	161	2027/28	143
2008/09	154	0	154	2028/29	143
2009/10	137	0	137	2029/30	143
2010/11	134	0	134	2030/31	143

Table 27 - Monthly Station Service Energy

MONTHLY STATION SERVICE ENERGY (GW.h)
History and Forecast

Fiscal Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
2010/11 Actual	10.2	9.9	7.3	6.8	7.2	7.4	9.5	12.9	16.4	17.1	14.4	15.0	134.2
2011/12	11.4	9.9	7.2	7.6	7.7	7.2	10.3	14.6	17.7	17.0	14.3	15.0	139.9
2012/13 - 2030/31	11.8	10.3	7.5	7.9	8.0	7.5	10.7	15.1	17.7	17.0	14.3	15.0	142.8

Table 28 - Monthly Station Service Peak

MONTHLY STATION SERVICE PEAK (MW)
History and Forecast
2011

Fiscal Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Annual
2010/11 Actual	17	15	11	10	8	11	17	22	24	25	24	25	25
2011/12	20	15	10	11	9	10	16	25	30	26	24	25	27
2012/13 - 2030/31	21	16	10	11	9	10	17	26	30	26	24	25	27

Gross Firm Energy and Gross Total Peak

The addition of Station Service to the Net Firm Energy and Net Total Peak produces the Gross Firm Energy and Gross Total Peak. Long term planning needs to include Station Service. The inclusion of the Station Service for committed plants in this document means the planners need to add only the Station Service for non-committed plants when deriving their load requirements.

A summary of the Gross Firm Energy and Gross Total Peak is in the following table.

Table 29 - Gross Manitoba Energy and Peak

GROSS MANITOBA HYDRO ELECTRIC LOAD FORECAST

History and Forecast
2000/01 - 2030/31

	Gross Firm Energy		Gross Total Peak		Load Factor
Fiscal Year	(GW.h)	Change (%)	(MW)	Change (%)	(%)
2000/01	20262		3672		63.0%
2001/02	20656	1.9%	3797	3.4%	62.1%
2002/03	22110	7.0%	3948	4.0%	63.9%
2003/04	22069	-0.2%	3994	1.2%	63.1%
2004/05	22589	2.4%	4201	5.2%	61.4%
2005/06	22757	0.7%	4085	-2.8%	63.6%
2006/07	23464	3.1%	4208	3.0%	63.7%
2007/08	24122	2.8%	4304	2.3%	64.0%
2008/09	24417	1.2%	4509	4.8%	61.8%
2009/10	23412	-4.1%	4393	-2.6%	60.8%
2010/11	23892	2.1%	4286	-2.4%	63.6%
2011/12	24615	3.0%	4557	6.3%	61.7%
2012/13	25173	2.3%	4649	2.0%	61.8%
2013/14	25930	3.0%	4767	2.5%	62.1%
2014/15	26284	1.4%	4840	1.5%	62.0%
2015/16	26406	0.5%	4888	1.0%	61.7%
2016/17	26794	1.5%	4967	1.6%	61.6%
2017/18	27205	1.5%	5050	1.7%	61.5%
2018/19	27481	1.0%	5115	1.3%	61.3%
2019/20	27966	1.8%	5203	1.7%	61.4%
2020/21	28462	1.8%	5293	1.7%	61.4%
2021/22	28887	1.5%	5374	1.5%	61.4%
2022/23	29311	1.5%	5455	1.5%	61.3%
2023/24	29733	1.4%	5535	1.5%	61.3%
2024/25	30153	1.4%	5615	1.4%	61.3%
2025/26	30570	1.4%	5695	1.4%	61.3%
2026/27	30984	1.4%	5773	1.4%	61.3%
2027/28	31396	1.3%	5851	1.4%	61.3%
2028/29	31801	1.3%	5928	1.3%	61.2%
2029/30	32208	1.3%	6005	1.3%	61.2%
2030/31	32608	1.2%	6081	1.3%	61.2%

UNEXPECTED POTENTIAL LOADS

These events are not expected within the next 20 years. These events all have low probability. They may occur but are not expected within the next 20 years and are not included in the energy or peak numbers of this document. They are listed so their effects can be considered if the need arises.

Eight different possibilities are considered, as summarized in the following table:

	Annual Energy Effect (GW.h) after 20 years	Annual Peak Effect (MW) after 20 years
Converting Diesel Customers to the Integrated System	+40	+9
Climate Change per Degree Celsius Warmer	+100	-40
2 Modest Size Server Farms	+200	+24
One New Very Large Industrial Customer	+1,500	+180
One Less Very Large Industrial Customer	-1,500	-180
Additional Load if Electric Vehicles Grow to 70%	+1,610	+201
Increased Residential Use of Electricity for Space heat	+814	+265
Increased Residential Use of Electricity for Water heat	+393	+45

To put these numbers into perspective, one year of energy growth is 432 GW.h and one year of peak growth is 80 MW.

Converting Diesel Customers to the Integrated System

There are 4 communities with electricity supplied by diesel generators that have about 600 Residential and 170 General Service customers that are presently not connected to the Manitoba Hydro electrical grid. If these customers were connected to the grid system, their consumption would be in addition to the existing system load.

Currently, residential customers in these communities receive only 60 amp service, but with the connection, they could also be upgraded to 200 amp service, allowing for their home to be

electrically heated. In total the added load for all communities by 2030/31 assuming conversion to electric heat would be about 40 GW.h and 9 MW.

	Energy (GW.h)	Peak (MW)
Additional Load after 20 years (in 2030/31)	+40	+9

Climate Change

There is much interest in the effect of climate change. Often the largest worry is that of global warming. The global warming assumption is that the average temperature of the world is increasing (without concern as to whether it is mankind or nature causing it).

Winnipeg's 25-year average temperature has varied between 4500 and 5000 Degree Days Heating (DDH) each year for the past 100 years. The data may or may not indicate a trend depending on the range of years selected. The amount of trend, if any, is also up to debate. This section will simply quantify the effect but does not forecast what future weather might be.

In Manitoba Hydro's case, if the average temperature rises, then there would be less winter heating and more summer air-conditioning.

Every degree Celsius of temperature rise will result in a decrease of 200 Degree Days Heating (DDH) over 200 winter days, and a corresponding increase of 100 Degree Days Cooling (DDC) per year over 100 summer days.

Applying the Weather effect for Manitoba Hydro at Generation gives:

Decrease of 200 DDH ➔ -200 GW.h and -40 MW in the winter

Increase of 100 DDC ➔ +300 GW.h and +120 MW in the summer

The resulting total effect of every one degree increase in temperature would be:

An increase of 100 GW.h to annual energy and a decrease of 40 MW to system peak.

	Energy (GW.h)	Peak (MW)
Additional Load after 20 years (in 2030/31)	+100	-40

Server Farms

A server farm, also called a data center or web farm, is a collection of computer servers which provide data services for a network of computers or a supercomputer. Server farms are typically co-located with network switches or routers which enable communication between the different parts of the cluster. The computers, routers, power supplies, and related electronics are typically mounted on 19-inch racks located in an air conditioned server room.

The size of server farms can be immense. Google, for example, has a 200,000 square foot facility on the Columbia River in Oregon with nearly a million servers using 900 GW.h per year with a peak of 100 MW.

To date, there are no server farms operating in Manitoba. However, if a modest size server farm consisting of 100,000 servers was built, a load of 12 MW and 100 GW.h would be anticipated. This would make it about the size of our 12th largest customer. Typical server farms employ 50 to 200 staff to maintain their operation.

Manitoba is an unlikely place for server farms due to its relative distance from network hubs. Should server farms situate here, they will most likely be gas heated and thus be a summer peaking facility due to air-conditioning load.

	Energy (GW.h)	**Peak (MW)**
Additional Load after 20 years (in 2030/31)	+200	+24

Potential Load from Very Large Industrial Customers

This forecast includes an expectation that there may be new large industrial users of electricity that may come to Manitoba. GS Top Consumers includes a Potential Large Industrial Loads category that adds 1,700 GW.h to GS Top Consumers by 2030/31. This is expected to be made up of increases and decreases by current top consumers, additions of new top consumers and company closures. However, this forecast does not anticipate the scenario of a single customer using up the entire PLIL category.

The largest customer at Manitoba Hydro currently uses in excess of 1,500 GW.h annually and has a coincident peak load of about 180 MW. It is feasible that one or more customers of this size could decide to start up in Manitoba in the next 20 years. A single unexpected large new customer could use the entire 1,700 GW.h of energy that has been reserved in the Potential Large Industrial Loads category.

Similarly, there is a chance that one or more very large customers can close down. This could also be the equivalent of losing Manitoba Hydro's largest customer, and needs to be considered as a possibility.

	Energy (GW.h)	Peak (MW)
Additional Load after 20 years (in 2030/31)	+1,500	+180
Loss of Load after 20 years (in 2030/31)	-1,500	-180

Potential Load from High Adoption of Electric Vehicle Technology

This forecast already assumes there will be a noticeable impact due to adoption of electric vehicles within Manitoba for the next twenty years. The specifics have been detailed in the Plug-In Electric Vehicles section of this document.

But there is a possibility that the current technological challenges will be solved. The U.S. Government is committed to fund and support the technology as a means to help reduce the nation's dependence on oil. Should breakthroughs and advances in battery technology happen in the next few years, it is possible that electric vehicles may grow to be the dominant vehicle. Under this assumption, electric vehicles may grow to be 70% of the market share in 40 years.

Assuming 70% of all vehicles in Manitoba in 2030/31 are Plug-In Electric Vehicles (PEVs), then these vehicles would use 1,720 GW.h and 215 MW. Currently, the forecast includes 110 GW.h and 9 MW for PEV's, therefore a 70% saturation would be an increase of 1,610 GW.h (almost 4 years of load growth) and 201 MW (about 2½ years of peak growth).

	Energy (GW.h)	Peak (MW)
Additional Load after 20 years (in 2030/31)	+1,610	+201

Increased Residential Use of Electricity for Space heat

With current natural gas prices, it is cheaper to heat one's home with natural gas than with electricity. This forecast assumes that natural gas will retain its price advantage over electricity for the next 20 years. The forecast is that by 2030/31, 222,939 or 40.2% of Residential Basic customers will heat their home with electricity.

However, there is a possibility that more customers will switch to electric space heat. If the percentage of electric heat billed customers rises to 50%, then by 2030/31, 277,571 electric heat customers would use 25,830 kW.h each, and 277,571 other customers would use 10,928 each. Total usage would be 10,203 GW.h, which is 814 GW.h higher than forecast (almost 2 years of load growth) in 2030/31. At a 35% load factor, this would add 265 MW to the peak (over 3 years of peak growth).

	Energy (GW.h)	**Peak (MW)**
Additional Load after 20 years (in 2030/31)	+814	+265

Increased Residential Use of Electricity for Water heat

New homes are now almost all built with electric water tanks rather than natural gas water tanks. In existing homes, as standard and mid-efficiency gas furnaces are being replaced with a high efficiency gas furnace, some homeowners are choosing to replace their existing natural gas water heaters with electric water heaters.

113,804 (20.5%) gas water heaters are forecast to be remaining in 2030/31. If market conditions were such that these remaining gas water heaters would instead all be converted to electric water heaters, this would add 3,457 kW.h per water heater, requiring 393 GW.h (about 1 year of load growth) in 2030/31. At a 100% load factor, this would add 45 MW to the peak (about ½ of a year of peak growth).

	Energy (GW.h)	**Peak (MW)**
Additional Load after 20 years (in 2030/31)	+393	+45

VARIABILITY AND ACCURACY

Load Variability

The forecast given in this document is assumed to be the best guess of what is likely to happen. It was produced with the expectation that there is a 50% chance that the actuals will be higher than forecast, and a 50% chance that the actuals will be lower than forecast.

This section presents a probability-based estimate of how much future actual loads might vary from forecast. This can be used to produce forecasts with a specific probability of occurrence, or can be used to determine the probability of specified loads occurring.

The standard deviation and correlation coefficient of historical weather adjusted load was determined. These were then applied to the base 50% forecast to give an estimate of the width of the energy and peak confidence bands. 10% and 90% confidence bands (-/+ 1.28 standard deviations) were selected to be a proxy for the Low and High Load Forecast Scenarios for use in risk analysis studies. They are calculated as follows:

Load = Base Fcst -/+ 1.28 x Standard Deviation

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

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

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

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

The following four charts and tables summarize the variability for energy and peak.

Figure 16 - Energy Variability

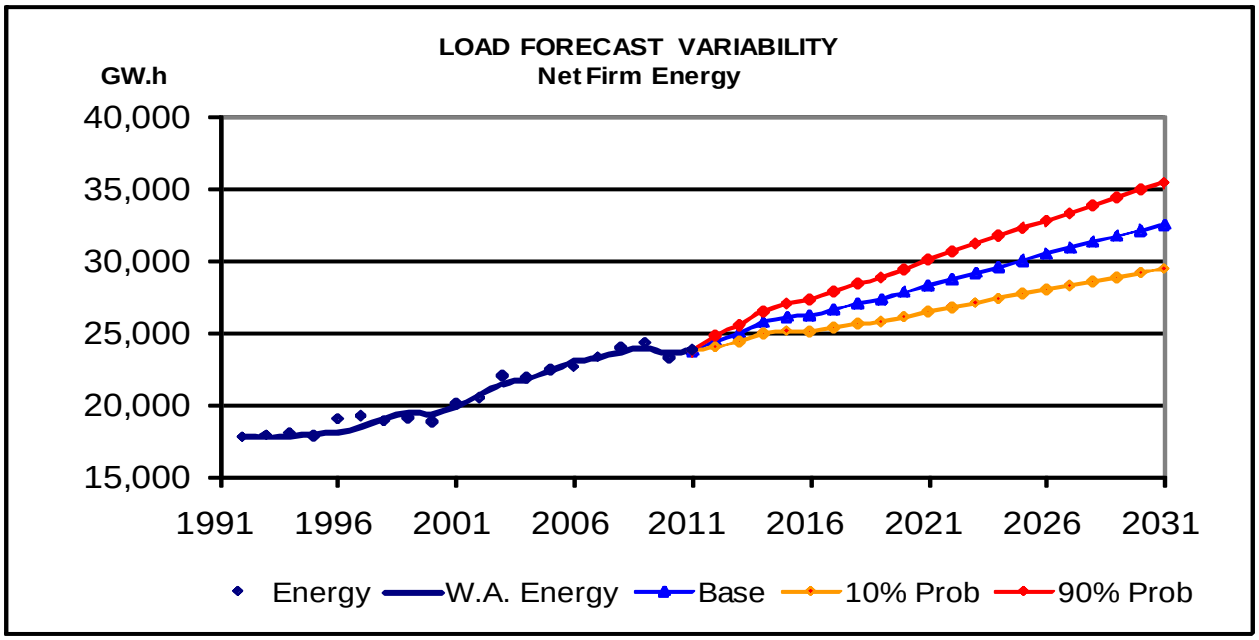


Table 30 – Energy Variability

Fiscal Year	Net Total Firm Base Fcst	Long Term Economic Std Dev	10.0% Prob Point	90.0% Prob Point
2011/12	24475	287	24108	24843
2012/13	25030	453	24449	25610
2013/14	25787	593	25028	26547
2014/15	26141	720	25218	27063
2015/16	26264	838	25190	27338
2016/17	26651	951	25433	27869
2017/18	27062	1059	25705	28419
2018/19	27338	1163	25847	28829
2019/20	27823	1265	26201	29444
2020/21	28319	1365	26570	30068
2021/22	28744	1462	26870	30618
2022/23	29169	1558	27172	31166
2023/24	29590	1653	27472	31708
2024/25	30011	1746	27773	32248
2025/26	30427	1838	28072	32783
2026/27	30841	1929	28369	33313
2027/28	31253	2019	28665	33841
2028/29	31658	2109	28955	34360
2029/30	32065	2197	29249	34881
2030/31	32465	2285	29537	35394

Figure 17 - Peak Variability

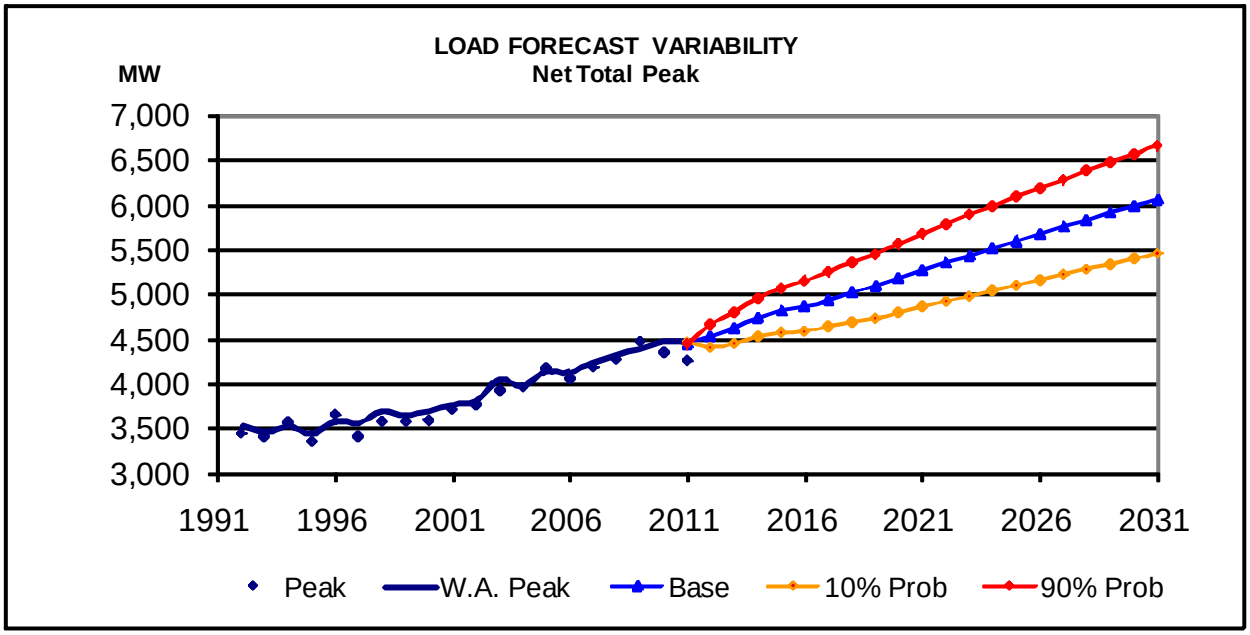


Table 31 – Peak Variability

Fiscal Year	Net Total Peak Base Fcst	Long Term Economic Std Dev	10.0% Prob Point	90.0% Prob Point
2011/12	4530	104	4397	4663
2012/13	4622	141	4441	4803
2013/14	4740	171	4520	4960
2014/15	4813	198	4559	5066
2015/16	4861	222	4576	5146
2016/17	4940	245	4627	5254
2017/18	5023	265	4683	5363
2018/19	5088	285	4722	5453
2019/20	5176	304	4787	5566
2020/21	5266	322	4854	5678
2021/22	5347	339	4913	5782
2022/23	5428	356	4973	5884
2023/24	5508	372	5032	5985
2024/25	5588	387	5092	6084
2025/26	5668	402	5152	6183
2026/27	5746	417	5212	6281
2027/28	5824	431	5272	6377
2028/29	5901	445	5331	6472
2029/30	5978	459	5390	6566
2030/31	6054	472	5448	6659

1 Year Forecast Accuracy

Overall, the 2010 Net Firm Energy forecast was 0.5% higher than the weather adjusted actuals.

Residential Basic and GS Mass Market were both under-forecast, whereas GS Top Consumers was over-forecast mostly due to two Consumers not starting projects as soon as was expected.

Total Peak is very difficult to estimate accurately. It has a high variation year-to-year that depends somewhat on the how severe the weather is, but is primarily affected by what GS Top Consumers are using during the cold days and the specific hours that might be competing to be the peak hour. The actual peak of 4261 MW was much lower than was expected. The previous three years, the actual peaks were higher: 4273 MW in 2007/08, 4477 MW in 2008/09 and 4359 MW in 2009/10.

Table 32 - 1 Year Forecast Accuracy

2010/11 Forecast Accuracy (GW.h)					
Sector	2010 Forecast Less DSM	Actuals	Weather Adjustment	W/A Actuals	Accuracy
Res Basic	7016	6952	85	7037	-0.3%
GS Mass Market	8102	8258	46	8304	-2.4%
GS Top Consumers	5610	5324	0	5324	5.4%
Misc Sales	258	253	0	253	2.1%
Total Sales	20986	20786	132	20918	0.3%
Less Diesel	13	13	0	13	1.7%
Construction	88	85	0	85	3.2%
Distribution Losses	976	947	-62	886	10.2%
Common Bus	22036	21806	70	21876	0.7%
Transmission Losses	1947	1977	4	1982	-1.7%
Less Interruptible	21	25	0	25	-13.6%
Net Firm Energy	23962	23758	75	23833	0.5%
Net Total Peak (MW)	4453	4261	192	4453	0.0%

5 and 10 Year Forecast Accuracy

The following four charts and tables compare previous load forecasts to actual results 5 and 10 years later.

The evaluated amount of DSM from incentive-based programs between the year the forecast was prepared and the year being forecast was subtracted first from the forecast value. The difference is taken as the accuracy of the forecast.

In general, the objective is to be within 1% for every year being forecast, so the goal is that a five year forecast is within 5% and a ten year forecast is within 10%. Generally this has been achieved in more than half the years for both energy and peak.

The following figures may seem to give the impression that there may be cycles in the forecast made up of alternating periods of over-forecasting and under-forecasting. But these are not so much due to a bias in the forecast as they are due to unexpected periods of recession or economic growth. Once one of these unexpected periods occur, it will affect the accuracy of the previous five 5-year forecasts, and the accuracy of the previous ten 10-year forecasts for ten years.

Compensation for these periods of over and under-forecasting cannot be applied until after the events occur and only then can be identified and quantified. The forecast assumes average expected economic conditions. When that does not occur, then the forecast will be high or low.

Figure 18 - Net Firm Energy Accuracy

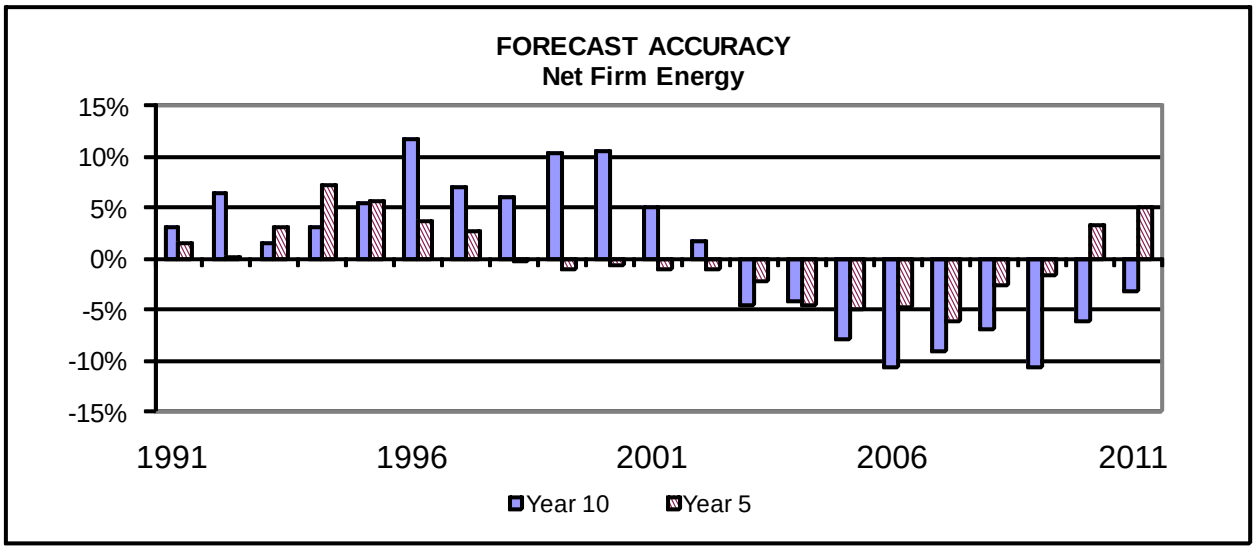


Table 33 - Net Firm Energy Accuracy

Fiscal Year	Actual Net Firm Energy	Forecast Prepared 5 Years Previous	W.A. Net Firm Energy	5 Year Percent Accuracy	Forecast Prepared 10 Years Previous	W.A. Net Firm Energy	10 Year Percent Accuracy
1990/91	17553	17994	17717	1.6%	18254	17709	3.0%
1991/92	17748	18135	18106	0.2%	19280	18123	6.5%
1992/93	17894	18533	17974	3.1%	18253	17950	1.6%
1993/94	18048	19440	18113	7.3%	18674	18101	3.1%
1994/95	17784	19400	18365	5.6%	19357	18365	5.4%
1995/96	19000	18985	18318	3.6%	20450	18370	11.6%
1996/97	19173	19199	18672	2.8%	19970	18716	7.0%
1997/98	18872	19258	19283	-0.1%	20452	19320	6.1%
1998/99	19095	19476	19657	-0.9%	21696	19708	10.4%
1999/00	18804	19453	19558	-0.5%	21611	19629	10.5%
2000/01	20075	19858	20057	-1.0%	21083	20103	5.1%
2001/02	20494	20622	20812	-0.9%	21146	20811	1.6%
2002/03	21940	21231	21686	-2.1%	20703	21694	-4.5%
2003/04	21890	20919	21898	-4.5%	20975	21943	-4.2%
2004/05	22426	21385	22465	-4.8%	20694	22518	-7.9%
2005/06	22598	22015	23114	-4.8%	20644	23183	-10.7%
2006/07	23305	21918	23341	-6.1%	21227	23441	-9.1%
2007/08	23961	23169	23797	-2.6%	22154	23871	-6.9%
2008/09	24262	23727	24118	-1.6%	21532	24181	-10.7%
2009/10	23275	24570	23784	3.3%	22308	23827	-6.2%
2010/11	23758	25091	23873	5.1%	23123	23927	-3.1%

Figure 19 - Net Total Peak Accuracy

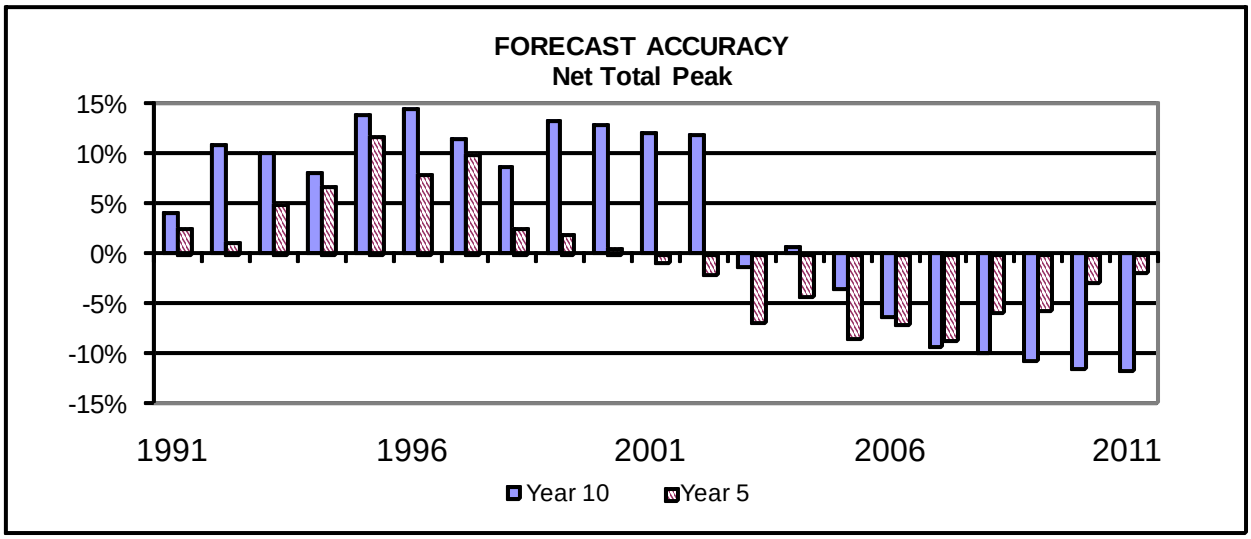


Table 34 - Net Total Peak Accuracy

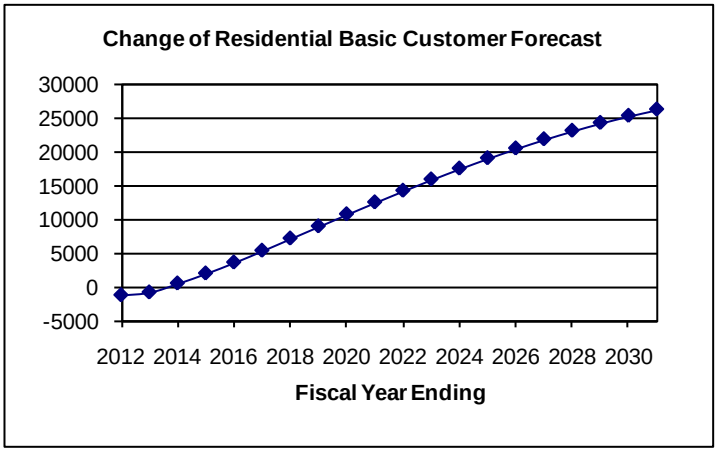
Fiscal Year	Actual Net Total Peak	Forecast Prepared 5 Years Previous	W.A. Net Total Peak	5 Year Percent Accuracy	Forecast Prepared 10 Years Previous	W.A. Net Total Peak	10 Year Percent Accuracy
1990/91	3542	3603	3512	2.6%	3652	3512	4.0%
1991/92	3435	3553	3513	1.1%	3892	3513	10.8%
1992/93	3404	3621	3454	4.8%	3799	3454	10.0%
1993/94	3567	3754	3516	6.8%	3799	3516	8.0%
1994/95	3342	3829	3427	11.7%	3904	3427	13.9%
1995/96	3649	3850	3568	7.9%	4081	3568	14.4%
1996/97	3408	3906	3553	9.9%	3962	3553	11.5%
1997/98	3573	3768	3674	2.6%	3990	3674	8.6%
1998/99	3572	3703	3630	2.0%	4108	3630	13.2%
1999/00	3588	3703	3682	0.6%	4152	3682	12.8%
2000/01	3706	3719	3755	-1.0%	4210	3755	12.1%
2001/02	3759	3719	3799	-2.1%	4251	3799	11.9%
2002/03	3915	3762	4039	-6.9%	3989	4039	-1.2%
2003/04	3958	3794	3960	-4.2%	3990	3960	0.8%
2004/05	4169	3778	4129	-8.5%	3984	4129	-3.5%
2005/06	4054	3825	4118	-7.1%	3858	4118	-6.3%
2006/07	4183	3858	4224	-8.7%	3826	4224	-9.4%
2007/08	4273	4060	4313	-5.9%	3886	4313	-9.9%
2008/09	4477	4125	4376	-5.7%	3907	4376	-10.7%
2009/10	4359	4334	4462	-2.9%	3951	4462	-11.5%
2010/11	4261	4371	4453	-1.8%	3930	4453	-11.7%

COMPARISON WITH THE 2010 FORECAST

Change of Residential Basic Customer Forecast

Figure 20 - Change of Res Basic Customer Forecast

The forecast of the number Residential Basic Customers is taken from Manitoba Hydro's Economic Outlook. The forecast of customers was increased considerably in the 2011 Economic Outlook. The main reason is an expectation of increased population in Manitoba attributed primarily to more immigration to the province.



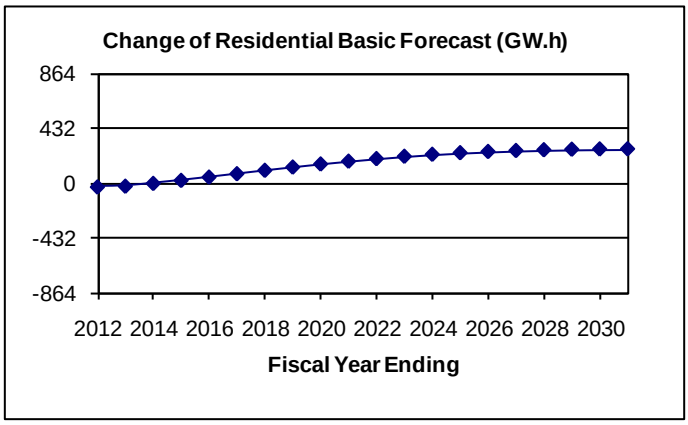
This is a large increase that will amount to 26,281 additional Residential Basic customers by 2030/31, an increase of 5.1%. This not only increases the Residential forecast but it has an additional effect of also increasing the General Service Mass Market forecast.

Table 35 - Change of Res Basic Customer Forecast

CHANGE OF RESIDENTIAL BASIC CUSTOMER FORECAST Comparison of 2010 to 2011 forecast										
Fisyr	2010 Fcst	2011 Fcst	Change	%		Fiscal Year	2010 Fcst	2011 Fcst	Change	%
2011/12	451664	450399	(1265)	-0.3%		2021/22	494080	508313	14233	2.9%
2012/13	456458	455614	(844)	-0.2%		2022/23	498086	513995	15909	3.2%
2013/14	460868	461353	485	0.1%		2023/24	502056	519576	17520	3.5%
2014/15	465122	467089	1967	0.4%		2024/25	505990	525046	19056	3.8%
2015/16	469349	472941	3592	0.8%		2025/26	509890	530395	20505	4.0%
2016/17	473548	478890	5342	1.1%		2026/27	513752	535617	21865	4.3%
2017/18	477717	484867	7150	1.5%		2027/28	517579	540705	23126	4.5%
2018/19	481857	490811	8954	1.9%		2028/29	521370	545658	24288	4.7%
2019/20	485965	496708	10743	2.2%		2029/30	525128	550471	25343	4.8%
2020/21	490039	502547	12508	2.6%		2030/31	528861	555142	26281	5.0%

Change of Residential Basic Forecast

Figure 21 - Change of Res Basic Forecast



The Residential Basic Forecast is up from the 2010 forecast. By 2030/31 the difference is 263 GW.h or 2.9%. This is equivalent to over 1/2 year of Manitoba system load growth (1 year = 432 GW.h).

Changes made (and the 2030/31 effect):

1. The forecast of the number of customers was increased by 26,281 customers (+525 GW.h).
2. The forecast of major appliances was increased using the new customer forecast (+28 GW.h)
3. The forecast of computers used a new model based on an analysis of the 2009 Residential Energy Use Survey, and included the breakdown between laptops and desktops by dwelling type. The forecast for 2030/31 better reflects future computer usage trends. (-289 GW.h)
4. The forecast of electric vehicles was reduced by about 40% (-57 GW.h) based upon revised industry saturation projections.
5. Some miscellaneous end uses had a small increase. (+56 GW.h)

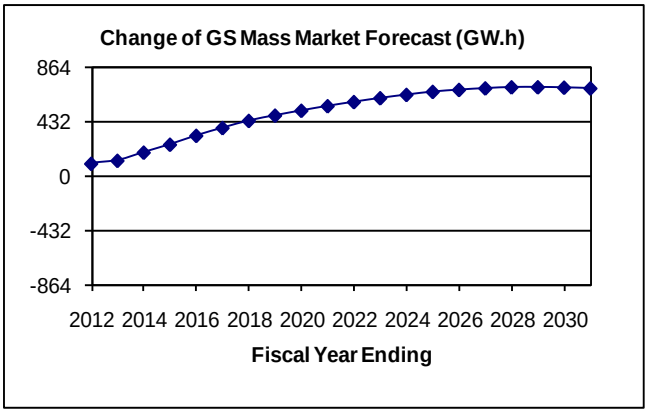
Table 36 - Change of Res Basic Forecast

CHANGE OF RESIDENTIAL BASIC FORECAST (GW.h) Comparison of 2010 to 2011 forecast										
Fiscal Year	2010 Fcst	2011 Fcst	Change	%		Fiscal Year	2010 Fcst	2011 Fcst	Change	%
2011/12	7149	7118	(31)	-0.4%		2021/22	8098	8285	187	2.3%
2012/13	7241	7216	(25)	-0.3%		2022/23	8203	8408	205	2.5%
2013/14	7329	7326	(3)	0.0%		2023/24	8311	8531	221	2.7%
2014/15	7418	7438	20	0.3%		2024/25	8422	8654	233	2.8%
2015/16	7509	7554	45	0.6%		2025/26	8535	8777	242	2.8%
2016/17	7602	7673	71	0.9%		2026/27	8650	8900	250	2.9%
2017/18	7697	7794	97	1.3%		2027/28	8767	9022	255	2.9%
2018/19	7794	7916	122	1.6%		2028/29	8885	9145	259	2.9%
2019/20	7893	8039	146	1.8%		2029/30	9005	9266	262	2.9%
2020/21	7994	8162	167	2.1%		2030/31	9126	9389	263	2.9%

Change of GS Mass Market Forecast

Figure 22 - Change of GS Mass Market Forecast

The General Service Mass Market Forecast is up from the 2010 forecast. By 2030/31 the difference is 705 GW.h or 6.6%. This is equivalent to over 1 1/2 years of Manitoba system load growth (1 year = 432 GW.h). This is primarily due to the increase in residential customers that also affects the Mass Market.



Changes made (and the 2030/31 effect):

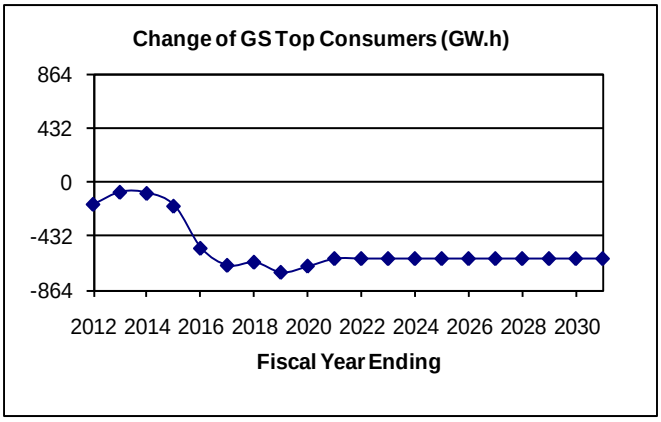
1. The model was improved to forecast the increase in customers as a function of GDP growth and residential customer growth. Average use for each group (Small non-Demand, Small Demand, Medium, and Large excluding GS Top Consumers) was assumed to be constant over the forecast period. Customers are expected to switch groups as their usage increases, rather than increase the average use of each group. (-120 GW.h)
2. The GDP forecast used was higher than in 2010 (+148 GW.h)
3. The residential customer forecast was higher leading to an increase in the GS Mass Market (+705 GW.h)
4. The forecast of electric vehicles was reduced by about 40% (-28 GW.h) based upon revised industry saturation projections.

Table 37 - Change of GS Mass Market Forecast

CHANGE OF GS MASS MARKET FORECAST (GW.h) Comparison of 2010 to 2011 forecast										
Fiscal Year	2010 Fcst	2011 Fcst	Change	%		Fiscal Year	2010 Fcst	2011 Fcst	Change	%
2011/12	8305	8408	103	1.2%		2021/22	9467	10063	596	6.3%
2012/13	8439	8566	127	1.5%		2022/23	9585	10211	627	6.5%
2013/14	8569	8762	192	2.2%		2023/24	9704	10357	653	6.7%
2014/15	8681	8937	256	2.9%		2024/25	9824	10502	677	6.9%
2015/16	8786	9113	327	3.7%		2025/26	9951	10643	693	7.0%
2016/17	8899	9287	388	4.4%		2026/27	10078	10783	705	7.0%
2017/18	9010	9456	446	4.9%		2027/28	10207	10921	713	7.0%
2018/19	9123	9611	488	5.3%		2028/29	10338	11052	714	6.9%
2019/20	9236	9763	527	5.7%		2029/30	10470	11181	711	6.8%
2020/21	9351	9914	563	6.0%		2030/31	10604	11308	705	6.6%

Change of GS Top Consumers Forecast

Figure 23 - Change of GS Top Consumer Forecast



The General Service Top Consumers start off down 124 GW.h in 2011/12 but are up slightly for the next three years. They are again down for the following five years due to the expected drop of load from a Top Consumer. By 2030/31 they are down 613 GW.h or 7.5%. This is equivalent to the reduction of almost 1 1/2 years of Manitoba system load growth (1 year = 432 GW.h).

Changes made (and the 2030/31 effect):

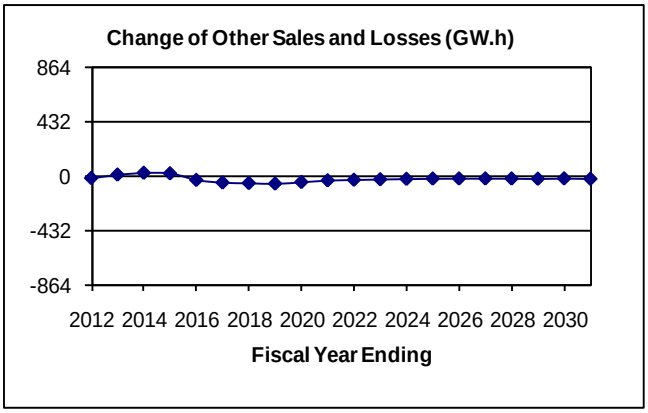
1. One top consumer is expected to reduce its load 625 GW.h by 2016/17. (-625 GW.h)
2. Two other top consumers are expected to grow by a combined 325 GW.h (+325 GW.h)
3. One other top consumer is expected to reduce load by 100 GW.h (-100 GW.h)
4. Potential Large Industrial Loads begins in the 4th year of the forecast, which in the 2011 forecast is one year later giving one less year of PLIL growth. (-100 GW.h)
5. Small changes to the forecasts of the other top consumers. (-113 GW.h)

Table 38 - Change of GS Top Consumer Forecast

CHANGE OF GS TOP CONSUMERS FORECAST (GW.h) Comparison of 2010 to 2011 forecast										
Fiscal Year	2010 Fcst	2011 Fcst	Change	%		Fiscal Year	2010 Fcst	2011 Fcst	Change	%
2011/12	5909	5730	(179)	-3.0%		2021/22	7263	6651	(613)	-8.4%
2012/13	6033	5951	(82)	-1.4%		2022/23	7363	6751	(613)	-8.3%
2013/14	6375	6284	(92)	-1.4%		2023/24	7463	6851	(613)	-8.2%
2014/15	6499	6306	(194)	-3.0%		2024/25	7563	6951	(613)	-8.1%
2015/16	6666	6136	(531)	-8.0%		2025/26	7663	7051	(613)	-8.0%
2016/17	6857	6191	(667)	-9.7%		2026/27	7763	7151	(613)	-7.9%
2017/18	6917	6276	(642)	-9.3%		2027/28	7863	7251	(613)	-7.8%
2018/19	6963	6241	(723)	-10.4%		2028/29	7963	7351	(613)	-7.7%
2019/20	7063	6391	(673)	-9.5%		2029/30	8063	7451	(613)	-7.6%
2020/21	7163	6551	(613)	-8.6%		2030/31	8163	7551	(613)	-7.5%

Change of Other Sales and Losses Forecast

Figure 24 - Change of Other Sales and Losses Forecast



Other sales and losses are down slightly from the 2010 forecast. By 2030/31 the difference is -24 GW.h or -0.5%.

Changes made (and the 2030/31 effect):

1. Residential Seasonal is down due to a reduction in the future expected average use per customer. (-43 GW.h)
2. Distribution Losses are up reflecting the increase in the sales forecast. (+11 GW.h)
3. Transmission Losses are up reflecting the increase in the Manitoba at Common Bus forecast. (+26 GW.h)
4. The Station Service forecast has been reduced reflecting the reduction at the Brandon Generating Station. (-18 GW.h)
5. Small changes to the forecasts of the other groups. (0 GW.h)

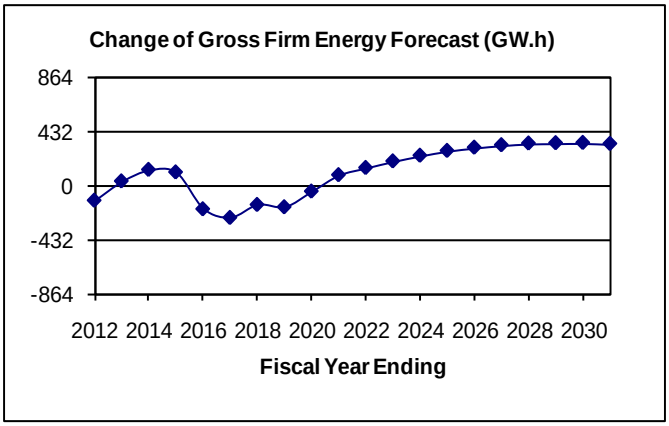
Table 39 - Change of Other Sales and Losses Forecast

OTHER SALES AND LOSSES (GW.h) Comparison of 2010 to 2011 forecast										
Fiscal Year	2010 Fcst	2011 Fcst	Change	%		Fiscal Year	2010 Fcst	2011 Fcst	Change	%
2011/12	3376	3358	(18)	-0.5%		2021/22	3921	3888	(32)	-0.8%
2012/13	3429	3440	11	0.3%		2022/23	3969	3941	(28)	-0.7%
2013/14	3534	3560	25	0.7%		2023/24	4019	3994	(25)	-0.6%
2014/15	3583	3604	21	0.6%		2024/25	4069	4047	(22)	-0.6%
2015/16	3638	3604	(34)	-0.9%		2025/26	4120	4099	(21)	-0.5%
2016/17	3698	3643	(55)	-1.5%		2026/27	4172	4151	(21)	-0.5%
2017/18	3738	3679	(59)	-1.6%		2027/28	4225	4203	(22)	-0.5%
2018/19	3777	3713	(64)	-1.7%		2028/29	4278	4254	(24)	-0.6%
2019/20	3824	3774	(51)	-1.3%		2029/30	4331	4310	(21)	-0.5%
2020/21	3872	3835	(37)	-1.0%		2030/31	4385	4361	(24)	-0.5%

Change of Gross Firm Energy Forecast

Figure 25 - Change of Energy Forecast

The Gross Firm Energy forecast starts off down 124 GW.h in 2011/12 but is up slightly for the next three years. It is again down for the next five years due to the expected drop of load from a Top Consumer. By 2030/31 it is up 331 GW.h from the 2010 forecast. This is equivalent to 3/4 of a year of load growth (1 year = 432 GW.h).



Changes made (and the 2030/31 effect):

1. Residential Basic forecast (+263 GW.h)
2. General Service Mass Market forecast (+705 GW.h)
3. General Service Top Consumers forecast (-613 GW.h)
4. Other Sales and Losses (-24 GW.h)

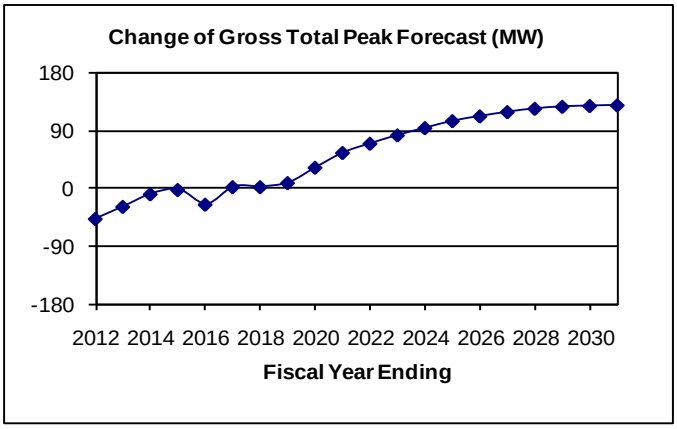
Table 40 - Change of Energy Forecast

GROSS FIRM ENERGY (GW.h) Comparison of 2010 to 2011 forecast										
Fiscal Year	2010 Fcst	2011 Fcst	Change	%		Fiscal Year	2010 Fcst	2011 Fcst	Change	%
2011/12	24739	24615	(124)	-0.5%		2021/22	28748	28887	139	0.5%
2012/13	25142	25173	31	0.1%		2022/23	29120	29311	191	0.7%
2013/14	25807	25930	123	0.5%		2023/24	29496	29733	237	0.8%
2014/15	26180	26284	103	0.4%		2024/25	29878	30153	275	0.9%
2015/16	26599	26406	(192)	-0.7%		2025/26	30269	30570	301	1.0%
2016/17	27055	26794	(262)	-1.0%		2026/27	30663	30984	321	1.0%
2017/18	27362	27205	(158)	-0.6%		2027/28	31062	31396	334	1.1%
2018/19	27657	27481	(176)	-0.6%		2028/29	31464	31801	337	1.1%
2019/20	28016	27966	(50)	-0.2%		2029/30	31869	32208	339	1.1%
2020/21	28381	28462	81	0.3%		2030/31	32277	32608	331	1.0%

Change of Gross Total Peak Forecast

Figure 26 - Change of Peak Forecast

Generally, the Gross Total Peak forecast follows a similar pattern of change to the Gross Firm Energy forecast. It starts down 47 MW in 2011/12 and remains down for the next four years. After that, the forecast is up and by 2030/31 is 129 MW higher than 2010 forecast. This is equivalent to over 1 1/2 years of peak load growth (1 year = 80 MW).



In 2030/31, the peak is up 2.2% compared to the Gross Firm Energy only being up 1.0%. This is because the sectors increasing the most (Residential Basic and General Service Mass Market) contribute more to the peak (i.e. they have low load factors - high peak relative to energy), and the sector decreasing (General Service Top Consumers) contributes less to the peak (they have high load factors - low peak relative to energy).

Table 41 - Change of Peak Forecast

GROSS TOTAL PEAK (MW) Comparison of 2010 to 2011 forecast										
Fisyr	2010 Fcst	2011 Fcst	Change	%		Fiscal Year	2010 Fcst	2011 Fcst	Change	%
2011/12	4604	4557	(47)	-1.0%		2021/22	5305	5374	69	1.3%
2012/13	4677	4649	(28)	-0.6%		2022/23	5373	5455	82	1.5%
2013/14	4776	4767	(9)	-0.2%		2023/24	5442	5535	93	1.7%
2014/15	4842	4840	(2)	0.0%		2024/25	5511	5615	104	1.9%
2015/16	4913	4888	(25)	-0.5%		2025/26	5583	5695	112	2.0%
2016/17	5048	5050	2	0.0%		2026/27	5655	5773	118	2.1%
2017/18	5048	5050	2	0.0%		2027/28	5728	5851	123	2.2%
2018/19	5106	5115	9	0.2%		2028/29	5802	5928	126	2.2%
2019/20	5171	5203	32	0.6%		2029/30	5877	6005	128	2.2%
2020/21	5238	5293	55	1.1%		2030/31	5952	6081	129	2.2%

METHODOLOGY

Residential Basic Methodology

The Residential Basic forecast was calculated using a detailed end use approach. The forecast of the total number of Residential Customers was from Manitoba Hydro's 2011 Economic Outlook. The 2009 Residential Energy Use Survey provided current end use saturation rates, detailed information on newly constructed dwellings, and appliance age distributions and their expected lifetimes. The end use assumptions include usage information and efficiency improvement information. The number of appliances and their estimated usage were multiplied together to calculate an energy forecast for each end use, and then all uses were combined to calculate the total use for the Residential End Use Forecast.

a) Number of Residential Customers - The Economic Analysis Department forecast the total number of residential customers for the 2011/12 to 2030/31 period. This customer forecast was the primary input for the Residential End Use Model.

b) Dwelling Type and Area - The 2009 Residential Survey was used to estimate the number of customers to various dwelling types (Single Detached, Multi-family Attached, and Individually-Metered Apartments). Single detached dwelling types are subclassified as Winnipeg, Gas Available Areas Outside of Winnipeg, and Gas Unavailable Areas.

c) Electric Heat Billed and Other Heat - Each combination of Dwelling Type and Area are divided into two groups: Electric Heat Billed Customers and Other Heat. Electric Heat Billed Customers pay for their space heat with their electricity bill. Other Heat customers may use natural gas or propane, or may use electric heat but are not billed directly.

For Single Detached Homes in Gas Available Areas Excluding Winnipeg, the number of newly constructed homes choosing electric heat was econometrically forecast using the following equation:

Change in Percentage of Newly Constructed Single Detached Homes in Gas Available Areas Outside of Winnipeg with Electric Heat Billed (t)

= -.001 + 0.733 x Chg PG/PE

Change in PG/PE

= Price of Gas per mmBTU (t-1) / Price of Electricity per mmBTU (t-1)

- Price of Gas per mmBTU (t-2) / Price of Electricity per mmBTU (t-2)

R-squared: 45.2%

T-stats:

Constant : -0.10

Chg PG/PE : 3.74

A modified version of this model was used to forecast heating appliances in newly constructed single detached homes in Winnipeg.

Electric space heating end uses are attributed to the Electric Heat Billed classification. Energy for other end uses is proportioned into the Electric Heat Billed and Other Heat classifications.

Electric Heat Billed Usage (GW.h)

= Total Electric Space Heating Usage

+ 1.063 x Average Use for All Non-Space Heating End Uses

x Electric Heat Billed Customers

Other Usage (GW.h)

= Total Residential Usage - Electric Heat Billed Usage

Total Residential Usage (GW.h)

= Sum of All Individual End Uses

d) Appliance Forecast - Historical saturation and age distribution data was collected from the 2009 Manitoba Hydro Residential Survey. Saturations were forecast using a birth/death/replacement model.

e) Appliance Usage - The current estimates of annual appliance usage, also called Unit Energy Consumptions (UECs) were calculated using 2003 Residential Survey information and Conditional Demand Analysis techniques. The survey results were screened for consumption

records and survey completeness. Missing values for the size of home, people per household and income questions were imputed. Degree days heating/cooling and demographic factors such as income and people per household were added to help explain usage variations. They were then normalized for the average customer. UECs will be updated for the 2012 Electric Load Forecast using the 2009 Residential Survey once the Conditional Demand Analysis of the 2009 Survey data has been completed.

f) Efficiency Improvements - New end uses are typically more efficient than existing stock. The average use will change due to the amount of efficiency improvement and the rate that older inefficient stock is replaced. The future consumption levels of each end use were analyzed and forecast independently based on literature, contact with other utilities and professional judgment. Efficiency improvements due to future standards are taken into account, savings due to DSM programs are not.

g) Total Use - The forecast number of appliances was multiplied by the forecast UECs to get the forecast kW.h per appliance. The appliance usages were summed to get the total use for the Residential Basic rate class. Two-thirds of the Plug-In Electric Vehicle forecast is added to the Residential GW.h. (The other one-third of the electric vehicle forecast is allocated to the General Service Mass Market forecast.)

General Service Mass Market Methodology

Econometric analysis of sales data is used to develop models for the number of customers. Forecasts of Manitoba GDP and Manitoba Hydro Residential Customers by the Economic Analysis Department are then input into the models, which generate forecasts for the number of customers for each year of the forecast period.

Average use for each rate class is forecast to remain at 2010/11 levels over the forecast period. This is because customers are assigned to rate classes based on their usage, and they are reassigned to a different class if their usage changes substantially. As a result the number of customers in each class may change but average use within each class generally does not.

The forecasts for customers and average use are multiplied together to generate total GW.h for each rate class. One-third of the Plug-In Electric Vehicle forecast is added to the GW.h for the Small Non-Demand rate class. (The other two-thirds of the electric vehicle forecast are allocated to the Residential forecast.) Forecast savings from future standards and construction codes are taken off of the forecast to calculate the Total Use.

General Service Mass Market Customer Forecast

The number of customers at fiscal year end was forecast using the following calculations for each year (t):

Number of Customers (t)
= Number of Customers (t-1)
+ Change in the Number of Customers (t)

Change in the Number of Customers (t)
= Number of Customers (t-1)
x Percentage Change in Number of Customers (t)

The percentage change in number of customers was modeled using year end historical customer data from 1984/85 to 2010/11. The resulting model and parameters are as follows:

Percentage Change in Number of Customers (t)

= -0.002 + 0.130 x CGDP + 0.665 x CRES

CGDP - Annual Percentage Change in Manitoba Gross Domestic Product

CRES - Annual Percentage Change in Residential Basic Customers

R-squared: 55.1%

T-stats:

Constant : -1.26

CGDP : 3.41

CRES : 3.54

General Service Mass Market Average Use Forecast

The General Service Mass Market class consists of commercial customers grouped into four rate classes:

i) Small Non-Demand (0 to 50 kV.A),
ii) Small Demand (50 to 200 kV.A),
iii) Medium (above 200 kV.A but do not own transformation capabilities), and
iv) Large (above 200 kV.A and own their own transformation capabilities).

The average use for each group is forecast to remain at 2010/11 levels over the forecast period. Specifically these are:
i) Small Non-Demand - 31,451 kW.h per year
ii) Small Demand - 163,595 kW.h per year
iii) Medium - 1,583,580 kW.h per year
iv) Large - 5,919,239 kW.h per year

Customers in the Top Consumer class are excluded from these classes for forecasting purposes.

For the forecast, customers are assigned to a rate class depending on their usage. If usage by an individual customer increases (or decreases) sufficiently then they will be re-assigned to the appropriate rate class. These shifts tend to offset each other over time so individual classes

have not shown significant upward or downward trends in average use. By definition, the truncation of these classes results in relatively stable average use for each class.

General Service Mass Market Total Use Forecast

Total Use (t)

= Number of Small Non-Demand Customers (t)

x Average Annual Use of Small Non-Demand Customers (t)

+ 1/3 of Plug-in Electric Vehicle Forecast

+ Number of Small Demand Customers (t) x Average Annual Use of Small Customers (t)

+ Number of Medium Customers (t) x Average Annual Use of Medium Customers (t)

+ Number of Large Customers (t) x Average Annual Use of Large Customers (t)

- Forecast Savings from DSM and Construction Codes (t)

General Service Top Consumers Methodology

Top Consumers is made up of the largest electricity users of Manitoba Hydro. The general criterion is that a company needs to have used 50 GW.h in a year, or have the potential to consume 50 GW.h in a year. A Top Consumer is not necessarily located in one place, but may consist of services at number of locations throughout the Province. A Top Consumer will be one company, but may count as multiple billing customers.

Each company in the Top Consumers group is forecast individually. Information on individual company operating plans is collected from industry news, Manitoba Hydro's economic experts and Manitoba Hydro's Key & Major Account representatives. This information is used to prepare company specific forecasts.

Normally, information is only available for the next 3 to 5 years for any company. These short term considerations are taken into account, and then the company's forecast remains constant.

To account for longer term growth in this group of consumers, a special classification called Potential Large Industrial Loads (PLIL) has been created. PLIL is used instead of attempting to forecast each consumer individually for the long term. It represents the natural growth of all the top consumers as a group, as well as unexpected major expansions, new customers, or loss of customers from GS Top Consumers.

In the 3 to 5 year forecast of individual consumers, 2 more major expansions and 2 more major losses of load are specifically included in the forecast. Starting in 2014/15, the 100 GW.h is forecast for PLIL to account for unforeseen expansion, contraction and growth. This will result in the addition of 1,700 GW.h of PLIL after 20 years.

Other Sectors

Seasonal, Water Heating, Lighting

Most of the smaller sales sectors, including Seasonal, Flat Rate Water Heating and Area and Roadway Lighting were done by analysis of changes in the number of customers or services and in changes in average use per customer or service. Growth rates were applied based on history and a best estimate as to what the future will bring.

Diesel

Each of the diesel towns was individually forecast. An additional forecast was produced assuming that the customers would be converted to the Integrated System and given 200 amp service which would allow electric heating.

Electric Vehicles

The methodology for forecasting Electric Vehicles was to research relevant recent literature and to apply appropriate assumptions from this literature to Manitoba's situation. The forecast section on Electric Vehicles provides the details.

Monthly Sales Allocations

Monthly percentages of customer growth through the year and GW.h for the month of the year were averaged for the past five years. These were then applied to the forecast annual customers and kW.h to get the monthly forecast.

Monthly System Energy and Peak

Two years of hourly common bus data was used as the starting point. Hourly customer data was also available for the Top Consumers and the larger GS Mass Market customers. Load research sample data was used for estimates of the Residential and smaller Mass Market customers. The hourly sector totals were used to estimate total General Consumers Sales on an hourly basis. Common Bus was compared to the total sales to estimate Distribution Losses hourly. System operating estimates of the hourly Manitoba load was compared to the Common Bus to estimate Transmission Losses hourly.

Annual forecast growth was applied to each sector's hourly estimates. The sectors were summed to get an hourly forecast of General Consumers Sales. The Distribution Loss relationship was applied to get an hourly forecast of Common Bus. The Transmission Loss relationship was applied to get an hourly forecast of the hourly Manitoba load. The maximum hourly loads in each month were used to estimate the monthly System peak and annual System peak.

GLOSSARY OF TERMS

Area and Roadway Lighting sector - includes electricity sales for the Sentinel Lighting and Street Lighting rate groups.

Curtailable - is a load that can be curtailed on short notice. A discount is given for subscribing to this program. Curtailable loads can affect peak demand because some periods of curtailment may be at or near the system peak.

Degree Days Cooling (DDC) - Hot weather is expressed in Degree Days Cooling (DDC), which is the number of degrees warmer than 18 degrees Celsius each day is, based on the average of the high and low temperature of the day.

DDC = sum (max(0, (Daily high + Daily low) / 2) - 18)

Degree Days Heating (DDH) - Cold weather is expressed in Degree Days Heating (DDH), which is the number of degrees colder than 14 degrees Celsius each day is, based on the average of the high and low temperature of the day.

DDH = sum (max(0, 14 - (Daily high + Daily low) / 2))

General Consumers Sales - includes the energy supplied to all of Manitoba Hydro's individually billed customers. It excludes export sales.

General Service Mass Market - includes all Commercial and Industrial customers, excluding the Top Consumers group.

General Service sector - made up of sales to Commercial and Industrial businesses served by Manitoba Hydro. This sector consists of five rate groups (Basic, Diesel, Seasonal, Flat Rate Water Heating and Surplus Energy Program).

General Service Mass Market - includes all Commercial and Industrial customers, excluding the General Service Top Consumers.

General Service Top Consumers - is made up of the largest electricity users of Manitoba Hydro.

Gross Firm Energy and **Gross Total Peak** - are the same as Net Firm Energy and Net Total Peak except they include Station Service. These are the numbers used for power planning.

Integrated System - is the power grid that connects Manitoba Hydro's generation sources to its customers. All Manitoba Hydro's customers except diesel are on the Integrated System.

Interruptible (Non-Firm) Energy - includes all energy sold to Manitoba customers on a non-firm basis. Currently, the only rate group for this is the Surplus Energy Program (SEP).

Load Factor - is the ratio of the average hourly energy over a period, usually a year, divided by the energy used at a specific hour, usually the hour of system peak. A load factor of 25% means that the average energy is one-quarter of what is used at system peak. A Load factor greater than 100% means that the average hourly energy is more than what is used at system peak. Given a specific energy, a lower load factor means a higher peak. The equation is:

Load Factor = (Total Energy / Hours) / (Energy over the hour of system peak)

Manitoba Load at Common Bus - is the total load measured from all the distribution points (i.e. substations) within Manitoba. It includes all energy supplied to General Consumers Sales customers plus associated Distribution Losses, but excludes diesel customers, Transmission Losses and Station Service.

Net Firm Energy - is the energy required to serve Manitoba Hydro's customers on the Integrated System. It excludes exports, interruptible (non-firm) loads, diesel customers and Station Service.

Net Total Peak - is the maximum integrated (i.e. average) hourly load required to serve Manitoba Hydro's customers on the Integrated System. It excludes exports, diesel customers and Station Service. It includes curtailable loads.

Residential sector - made up of sales to residential customers for non-business operations. The Residential sector is comprised of four rate groups (Basic, Diesel, Seasonal, and Flat Rate Water Heating).

Station Service - is the energy used by power plants to generate power and service their own load.