

ELECTRIC LOAD FORECAST

2009/10 to 2029/30

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MARKET FORECAST
May, 2009



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EXECUTIVE SUMMARY

Forecast Summary

Total Weather Adjusted Sales in 2008/09 amounted to 20,903 GW.h which was 287 GW.h less than what was forecast in the May 2008 System Load Forecast. This was primarily due to the Top Consumers using less than was predicted.

This has caused a reevaluation of the Top Consumers and further reductions are seen amounting to a reduction of last year's 2009/10 Total Sales forecast by 915 GW.h to 21,023 GW.h. Increases in other sectors over the forecast period lead to the 2028/29 Total Sales forecast of 27,679 GW.h , which is 588 GW.h down from last year's forecast.

An increase in the forecast of Distribution Losses results in a 2028/29 Net Firm Energy of 31,674 GW.h and Net Total Peak of 5,606 MW, down about one year of load growth.

FORECAST SUMMARY						
Sector	2008/09		2009/10		2028/29	
	W/A Actuals	Actual - 08 Fcst	2009 Fcst	Change in Fcst	2009 Fcst	Change in Fcst
Res Basic Standard	3229	26	3249	22	3849	87
Res Basic All-Electric	3446	-27	3505	-33	4683	109
GS Mass Market	7994	34	8059	-73	10464	66
GS Top Consumers	6065	-325	5956	-839	8413	-847
Misc Sales	249	4	253	7	270	-2
Total Sales	20983	-287	21023	-915	27679	-588
Distribution Losses	1052	138	1037	94	1366	151
Transmission Losses	1979	13	1978	-51	2599	-12
Net Firm Energy	23994	-173	24080	-856	31674	-440
Net Total Peak (MW)	4324	-30	4333	-154	5606	-78

Important Forecast Changes

Change from Net to Gross

- At the request of the Planning and Operating Departments, the Manitoba Energy and Peak is now being provided as Gross numbers (including Station Service Load) rather than as Net numbers (excluding Station Service).
- The Station Service forecast now only includes committed plants (i.e. Wuskwatim). This will make it easier for planners to add Station Service for potential new plants.
- Net numbers are still being provided this year to allow easy comparison with last year's forecast.

General Consumers

- A new regression model was used to split the Residential Basic customer forecast into All-Electric and Standard. The model is a logical improvement of the previous model, using yearly changes instead of lagged values.
- The General Service Mass Market sector is now forecast with an Average Use model which is multiplied by the customer forecast to give the GW.h. Last year the GW.h were modeled directly. This removes the double influence of customers which are inherently included in the GW.h.
- An Electric Vehicles forecast is now included in this document in its own section. Two-thirds of the forecast was added to the Residential sector and the rest to GS.

Scenarios and Probability

- The Medium-High and Medium-Low scenarios are no longer being forecast or included in this document. These were based on optimistic and pessimistic economic scenarios but were difficult for Resource Planning to use.
- They are being replaced by a Probability-based forecast that quantifies variation from the Base Case in terms of probability. This will allow planners to use risk-based analysis. Any probability point can be computed from the described calculations. The Load Forecast Variability section of this document provides these probability-based forecasts.

- The term “scenario” is now being reserved and used to represent a single specific change to be analyzed. Most often, these will be possible happenings that are not included in the forecast, but may have a significant effect. A new Scenarios section has been added to this forecast, and the three scenarios described are:
 1. Electric Vehicle Technology Advances
 2. Confidence of Low Rates by Industrial Customers
 3. Cost of Heating Electrically Less than Gas

Demand Side Management in the Forecast

- This forecast contains a reduction for future DSM savings associated with the Basic Customer Information and Service. 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 options are analyzed on an incremental basis to this level. Beyond 2008/09, the incremental savings associated with other DSM options are treated as supply-side resources and therefore are not included in this forecast.
- By 2029/30, the Basic Customer Option is estimated to result in a total of 181 MW and 960 GW.h of savings at the customers’ meter. These savings are expected to occur in the Residential sector (150 MW and 865 GW.h) and in the Commercial sector (31 MW and 95 GW.h). Adding another 14% savings due to reduced T & D losses, the total savings at generation will be 207 MW and 1094 GW.h by 2029/30.

Table 1

NET MANITOBA HYDRO ELECTRIC LOAD FORECAST 2008/09 - 2029/30					
Fiscal Year	Net Firm Energy		Net Total Peak		Load Factor
	(GW.h)	Change (%)	(MW)	Change (%)	
2008/09 Actual	24262		4477		61.9%
Weather	-268		-153		
2008/09 Adjusted	23994		4324		63.3%
2009/10	24080	0.4%	4333	0.2%	63.4%
2010/11	24600	2.2%	4407	1.7%	63.7%
2011/12	25159	2.3%	4499	2.1%	63.8%
2012/13	25599	1.7%	4570	1.6%	63.9%
2013/14	26012	1.6%	4633	1.4%	64.1%
2014/15	26618	2.3%	4733	2.2%	64.2%
2015/16	26973	1.3%	4789	1.2%	64.3%
2016/17	27331	1.3%	4845	1.2%	64.4%
2017/18	27644	1.1%	4893	1.0%	64.5%
2018/19	27923	1.0%	4942	1.0%	64.5%
10 Year Avg.		1.5%		1.3%	
2019/20	28288	1.3%	5007	1.3%	64.5%
2020/21	28654	1.3%	5071	1.3%	64.5%
2021/22	29021	1.3%	5136	1.3%	64.5%
2022/23	29391	1.3%	5202	1.3%	64.5%
2023/24	29762	1.3%	5268	1.3%	64.5%
2024/25	30136	1.3%	5334	1.3%	64.5%
2025/26	30516	1.3%	5401	1.3%	64.5%
2026/27	30899	1.3%	5469	1.3%	64.5%
2027/28	31285	1.3%	5537	1.3%	64.5%
2028/29	31674	1.2%	5606	1.2%	64.5%
2029/30	32066	1.2%	5675	1.2%	64.5%
21 Year Avg.		1.4%		1.3%	
- See the Glossary of Terms for a definition of Net Firm Energy and Net Total Peak					

Table 2

GROSS MANITOBA HYDRO ELECTRIC LOAD FORECAST 2008/09 - 2029/30					
Fiscal Year	Gross Firm Energy		Gross Total Peak		Load Factor (%)
	(GW.h)	Change (%)	(MW)	Change (%)	
2008/09 Actual	24416		4509		61.8%
Weather	-268		-153		
2008/09 Adjusted	24148		4356		63.3%
2009/10	24239	0.4%	4363	0.1%	63.4%
2010/11	24759	2.1%	4437	1.7%	63.7%
2011/12	25323	2.3%	4530	2.1%	63.8%
2012/13	25763	1.7%	4601	1.6%	63.9%
2013/14	26177	1.6%	4664	1.4%	64.1%
2014/15	26783	2.3%	4764	2.1%	64.2%
2015/16	27137	1.3%	4820	1.2%	64.3%
2016/17	27495	1.3%	4876	1.2%	64.4%
2017/18	27808	1.1%	4924	1.0%	64.5%
2018/19	28088	1.0%	4973	1.0%	64.5%
10 Year Avg.		1.5%		1.3%	
2019/20	28452	1.3%	5038	1.3%	64.5%
2020/21	28818	1.3%	5102	1.3%	64.5%
2021/22	29185	1.3%	5167	1.3%	64.5%
2022/23	29555	1.3%	5233	1.3%	64.5%
2023/24	29927	1.3%	5299	1.3%	64.5%
2024/25	30300	1.2%	5365	1.2%	64.5%
2025/26	30681	1.3%	5432	1.3%	64.5%
2026/27	31063	1.2%	5500	1.2%	64.5%
2027/28	31450	1.2%	5568	1.2%	64.5%
2028/29	31838	1.2%	5637	1.2%	64.5%
2029/30	32230	1.2%	5706	1.2%	64.5%
21 Year Avg.		1.4%		1.3%	
- See the Glossary of Terms for a definition of Gross Firm Energy and Gross Total Peak					

Table 3

ENERGY SALES TO MANITOBA HYDRO CUSTOMERS (GW.h) Base Forecast 2008/09 - 2029/30							
Fiscal Year	Residential	General Service	Area & Roadway Lighting	Manitoba Hydro Sales Incl Diesel		Total Diesel	Manitoba Hydro Sales Excl Diesel
2008/09 Actual	6954	14154	102	21210	0.7%	13	21198
2009/10	6864	14056	103	21023	-0.9%	13	21010
2010/11	6946	14412	103	21462	2.1%	14	21448
2011/12	7031	14831	104	21965	2.3%	14	21952
2012/13	7119	15136	105	22360	1.8%	14	22346
2013/14	7208	15400	106	22713	1.6%	14	22699
2014/15	7298	15848	107	23253	2.4%	15	23239
2015/16	7389	16067	108	23564	1.3%	15	23549
2016/17	7482	16287	108	23877	1.3%	15	23862
2017/18	7575	16468	109	24151	1.1%	15	24136
2018/19	7669	16617	110	24396	1.0%	16	24380
2019/20	7764	16840	111	24715	1.3%	16	24699
2020/21	7859	17064	112	25035	1.3%	16	25019
2021/22	7956	17288	112	25357	1.3%	17	25340
2022/23	8055	17513	113	25681	1.3%	17	25664
2023/24	8155	17737	114	26006	1.3%	17	25989
2024/25	8256	17962	115	26333	1.3%	17	26316
2025/26	8358	18193	116	26666	1.3%	18	26648
2026/27	8460	18424	116	27001	1.3%	18	26983
2027/28	8564	18658	117	27339	1.3%	18	27321
2028/29	8668	18893	118	27679	1.2%	18	27661
2029/30	8774	19130	119	28022	1.2%	19	28004

Table 4

NET FIRM ENERGY (GW.h) Base Forecast 2008/09 - 2029/30								
Fiscal Year	Dist. Losses	Const. Power	Manitoba Load @ Common Bus	Trans. Losses	Net Firm Energy	Non Firm Energy	Station Service	Gross Total Energy
2008/09 Actual	1052	56	22305	1979	24262	23	154	24439
2009/10	1037	78	22125	1978	24080	22	159	24261
2010/11	1059	88	22595	2020	24600	15	159	24774
2011/12	1084	73	23108	2066	25159	15	164	25338
2012/13	1103	63	23512	2102	25599	15	164	25778
2013/14	1121	58	23878	2135	26012	0	164	26177
2014/15	1147	48	24434	2184	26618	0	164	26783
2015/16	1163	48	24759	2213	26973	0	164	27137
2016/17	1178	48	25088	2243	27331	0	164	27495
2017/18	1192	48	25376	2268	27644	0	164	27808
2018/19	1204	48	25632	2291	27923	0	164	28088
2019/20	1219	48	25966	2321	28288	0	164	28452
2020/21	1235	48	26302	2351	28654	0	164	28818
2021/22	1251	48	26639	2381	29021	0	164	29185
2022/23	1267	48	26979	2412	29391	0	164	29555
2023/24	1283	48	27320	2442	29762	0	164	29927
2024/25	1299	48	27663	2473	30136	0	164	30300
2025/26	1316	48	28012	2504	30516	0	164	30681
2026/27	1332	48	28363	2536	30899	0	164	31063
2027/28	1349	48	28718	2567	31285	0	164	31450
2028/29	1366	48	29075	2599	31674	0	164	31838
2029/30	1383	48	29434	2631	32066	0	164	32230
- See the Glossary of Terms for a definition of Gross Total Energy, Non Firm Energy, Station Service and Net Firm Energy								

Table 5

NET FIRM ENERGY AND NET TOTAL PEAK CHANGE FROM PREVIOUS FORECAST						
Fiscal Year	NET FIRM ENERGY			NET TOTAL PEAK		
	Forecast Prepared May 2009 (GW.h)	Forecast Prepared May 2008 (GW.h)	Difference (GW.h)	Forecast Prepared May 2009 (MW)	Forecast Prepared May 2008 (MW)	Difference (MW)
2009/10	24080	24937	-856	4333	4487	-154
2010/11	24600	25713	-1113	4407	4607	-201
2011/12	25159	26362	-1203	4499	4715	-216
2012/13	25599	26922	-1323	4570	4807	-237
2013/14	26012	27241	-1229	4633	4852	-219
2014/15	26618	27531	-913	4733	4896	-162
2015/16	26973	27827	-855	4789	4941	-152
2016/17	27331	28078	-747	4845	4977	-133
2017/18	27644	28418	-774	4893	5030	-137
2018/19	27923	28757	-834	4942	5090	-148
2019/20	28288	29095	-807	5007	5150	-143
2020/21	28654	29432	-778	5071	5209	-138
2021/22	29021	29768	-748	5136	5269	-132
2022/23	29391	30103	-712	5202	5328	-126
2023/24	29762	30438	-675	5268	5387	-120
2024/25	30136	30771	-635	5334	5446	-112
2025/26	30516	31108	-592	5401	5506	-105
2026/27	30899	31444	-545	5469	5565	-96
2027/28	31285	31779	-494	5537	5625	-87
2028/29	31674	32114	-440	5606	5684	-78
- See the Glossary of Terms for a definition of Net Firm Energy and Net Total Peak						

ECONOMIC ASSUMPTIONS

Economic forecast assumptions are taken from the 2009 Economic Outlook and the 2009 Energy Price Outlook. These documents contain Manitoba Hydro's official forecasts of economic variables including prices of electricity, natural gas and oil, Gross Domestic Product (GDP), Manitoba population and housing.

The following are the economic variables used for this Electric Load Forecast:

Manitoba Housing - The number of homes in Manitoba is forecast to increase by 0.9% (4064 units) in 2009/10 and averages 0.8% per year over the forecast period. This compares to a historical average increase of 0.8% per year over the last ten years. This is used in the Residential All-Electric and Standard customer forecast.

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 increase 0.9% per year throughout the forecast period. This is used in the Residential All-Electric customer forecast and in the GS Mass Market average use forecast.

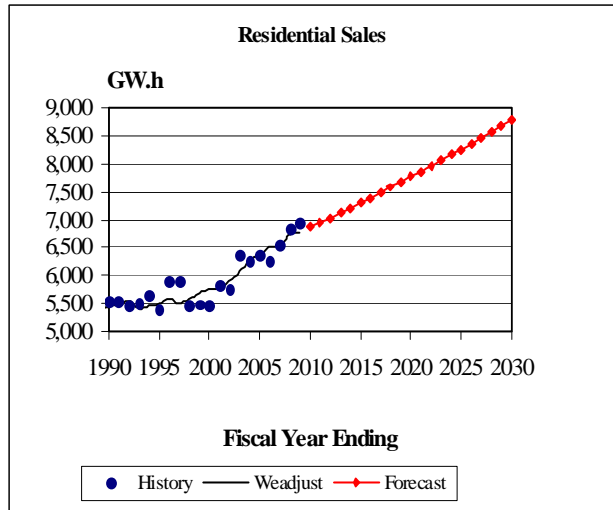
Natural Gas Prices – Manitoba Hydro views the natural gas price forecast as commercially sensitive information. Consistent with the Clean Environment Commission and Electric General Rate Application, this information will not be publicly disclosed. This is used in the Residential All-Electric customer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

Gross Domestic Product (GDP) - The forecast for real economic growth in Manitoba is 0.0% in 2009/10, 2.1% in 2010/11, 2.7% in 2011/12, then declines to 1.8% by 2023/24 and remains at that level for the remainder of the forecast period. This is used in the GS Mass Market customer forecast and in the GS Mass Market average use forecast.

RESIDENTIAL

The Residential sector represents 32.8% of all sales within Manitoba. It includes electricity sales to individually-metered Residential customers for non-business operations. The Residential sector is comprised of four forecast groups (Basic, Seasonal, Flat Rate Water Heating and Diesel.) The adjacent graph shows that load growth was minimal in the early to mid 1990's. Since 1998, Residential consumption has been growing steadily.

Figure 1



The Residential sector is forecast to increase from a weather adjusted base of 6,782 GW.h in 2008/09 to 8,774 GW.h by 2029/30. This represents an average growth of 95 GW.h per year, which is 13% lower than the ten year annual growth rate of 109 GW.h.

RESIDENTIAL (GW.h)					
HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Sales	Weather Adjust	Adjusted Sales	Fiscal Year	Forecast Sales
1988/89	5455	-97	5359	2009/10	6864
1989/90	5543	-97	5446	2010/11	6946
1990/91	5545	-87	5457	2011/12	7031
1991/92	5458	87	5545	2012/13	7119
1992/93	5489	-80	5409	2013/14	7208
1993/94	5632	-172	5460	2014/15	7298
1994/95	5388	106	5494	2015/16	7389
1995/96	5907	-324	5583	2016/17	7482
1996/97	5910	-400	5510	2017/18	7575
1997/98	5473	94	5568	2018/19	7669
1998/99	5482	207	5689	2019/20	7764
1999/00	5455	294	5749	2020/21	7859
2000/01	5830	-50	5780	2021/22	7956
2001/02	5765	117	5883	2022/23	8055
2002/03	6361	-289	6071	2023/24	8155
2003/04	6266	-9	6257	2024/25	8256
2004/05	6370	-6	6364	2025/26	8358
2005/06	6266	239	6506	2026/27	8460
2006/07	6539	-17	6522	2027/28	8564
2007/08	6838	-94	6744	2028/29	8668
2008/09	6954	-173	6782	2029/30	8774

Residential Basic

The Residential Basic category represents 98.5% of the total Residential sales. This category is separated into two distinct groups, All-Electric and Standard. All-Electric customers are capable of heating the premises with electricity and the rest are Standard customers. The average All-Electric customer uses 26,231 kW.h per year, whereas the average Standard customer uses 10,815 kW.h per year, the difference mostly being electric heat and electric water heat.

Figure 2

There currently are 437,262 Residential Basic customers, and this number is forecast to increase to 516,978 by 2029/30. Currently 31.4% of these are All-Electric and the rest are Standard. The All-Electric percentage is forecast to grow to 35.6% by 2029/30.

Figures 3 and 4 show the Standard and All-Electric Residential Basic energy use history and forecast.

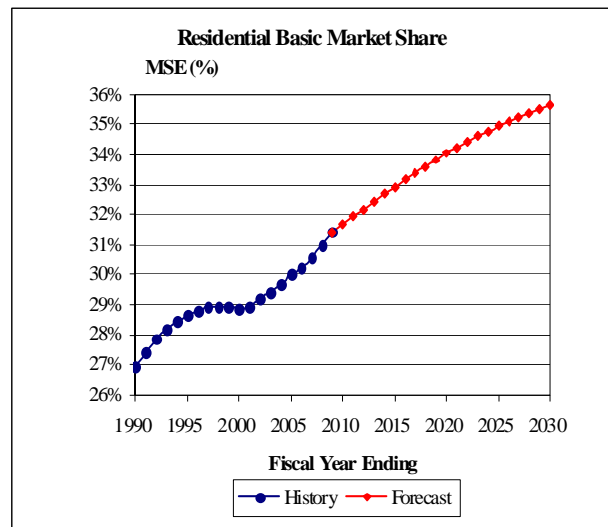


Figure 3

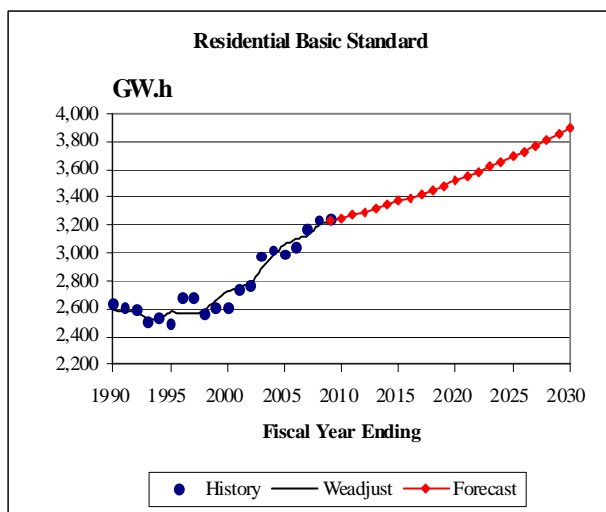
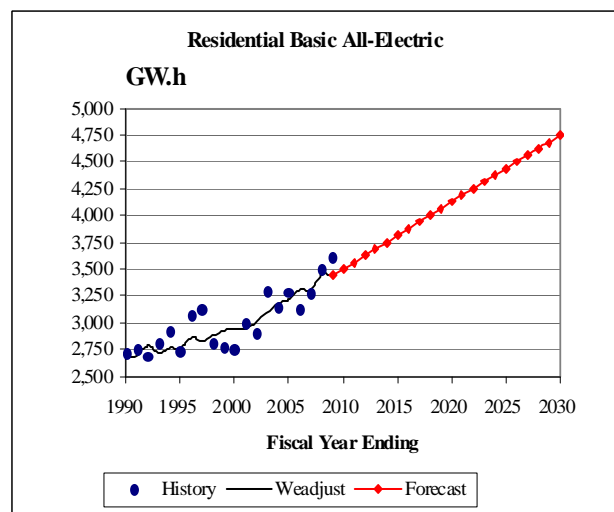


Figure 4



Residential Seasonal

There were 13,047 Residential Seasonal Standard customers as of March, 2009. The number of customers is expected to remain constant throughout the forecast period. The average use in 2008/09 was 2,733 kW.h per customer. This average use is forecast to increase 150 kW.h per customer in 2009/10, 100 kW.h per customer in 2010/11 and 50 kW.h per customer each year after. Sales are forecast to increase from 35.7 GW.h in 2008/09 to 51.3 GW.h in 2029/30.

There were 7,693 Residential Seasonal All-Electric customers as of March, 2009. The number of customers is expected to increase 75 per year throughout the forecast period. The average use in 2008/09 was 5,031 kW.h per customer. This average use is forecast to increase 200 kW.h per customer in 2009/10, 150 kW.h per customer in 2010/11 and 100 kW.h per customer each year after. Sales are forecast to increase from 38.7 GW.h in 2008/09 to 67.5 GW.h in 2029/30.

Total Residential Seasonal Sales are forecast to increase from 74 GW.h in 2008/09 to 119 GW.h in 2029/30.

Residential 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 4,980 remaining customers as of March, 2009. The number of customers is expected to decrease 5% per year throughout the forecast period. Sales were 25 GW.h in 2008/09 and that will decrease by 5% per year throughout the forecast period.

Residential Diesel

There are 4 diesel sites in Manitoba - Brochet, Lac Brochet, Tadoule Lake and Shamattawa. Diesel sales are included in General Consumer's sales, but are not part of the integrated system. These sites consumed 7.3 GW.h in 2008/09. Consumption is expected to increase to 10.8 GW.h by 2029/30.

Residential Basic Methodology

The forecast of the total number of Residential Customers is from Manitoba Hydro's 2009 Economic Outlook. Econometric analysis was used to forecast the customers in the All-Electric (capable of heating with electricity) and Standard (incapable) groups. The customer forecasts then became the primary input in the End Use Model.

The Residential energy forecast was calculated using a detailed end use approach. The most recent Residential Survey provided current appliance saturation rates, appliance age distributions and appliance lifetimes. This information was combined with previous survey results to prepare a forecast of future appliance saturation rates. Conditional Demand Analysis was performed on the appliance survey data to derive unit energy consumptions (UECs) for each appliance type. Energy Management staff provided estimates for future unit energy consumption of each major appliance and information about upcoming appliance standards. The expected savings from Manitoba Hydro's effect on changes to codes and standards were identified and quantified. The information was then used to calculate an energy forecast for each end use.

Customer Forecast

For the 2009/10 to 2029/30 period, the Economic Analysis Department provides forecasts for:

1. Total Number of Residential Customers,
2. Price of Electricity,
3. Price of Natural Gas.

These forecasts are used as inputs to the model for the forecast period.

The number of customers at fiscal year-end is forecast using the following calculations for each year (t).

Number of All-Electric Customers (t)

$$\begin{aligned} &= \text{Number of All-Electric Customers (t-1)} \\ &+ \text{Change in Number of All-Electric Customers (t)} \end{aligned}$$

Number of Standard Customers (t)

$$\begin{aligned} &= \text{Total Number of Residential Customers (t)} \quad [\text{from 2009 Economic Outlook}] \\ &- \text{Number of All-Electric Customers (t)} \end{aligned}$$

The change in the number of All-Electric Customers is modeled using year-end historical customer data from 1995/96 through 2008/09. The resulting model and parameters are as follows:

Change in Number of All-Electric Customers (t)

$$= 266.03 + 1.0787 \times \text{CTNRC} - 0.4057 \times \text{CTNRC} \times \text{PE} / \text{PNG}$$

CTNRC - Change in Total Number of Residential Customers

PE - Price of Electricity

PNG - Price of Natural Gas

R-squared: 86.7%

T-stats:

Constant (266.03) : 0.72

CTNRC : 7.99

CTNRC x PE / PNG : -3.70

Residential End Use Model

This model uses the Standard and All-Electric customer forecasts from the Market Share Model and incorporates appliance end use assumptions. The appliance end use assumptions include an appliance saturation forecast, appliance age distributions, current appliance usage information and appliance efficiency improvement information. This information is combined to prepare the Residential End Use Forecast.

a) Appliance Saturations and Age Distributions - Historical appliance saturation data was collected from previous Manitoba Hydro Residential Surveys. For some appliances, the Survey also supplied detailed age distributions. Appliance saturations were forecast using an appliance vintaging model where detailed age distributions are available and using a birth/death/replacement model where there was no age information. The number of replacement appliances was calculated using a modified Weibull distribution with estimated appliance lifetimes.

b) Appliance Usage - The current estimates of appliance usage or unit energy consumption (UEC) were calculated using 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.

c) Efficiency Improvements - New appliances are more efficient than existing appliance stock. The average use per appliance will decline 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 forecasted independently based on literature, contact with other utilities and professional judgment.

d) Identifying Appliance Types - The Residential Basic End Use Forecast is divided into Basic Standard and Basic All-Electric groups. Some appliances are only for electric space heating and apply only to All-Electric customers. The electric space heating end uses are added to the All-Electric classification. The other end uses are proportioned into the Standard and All-Electric classifications.

All-Electric Usage (GW.h)

$$\begin{aligned} &= \text{Total Electric Space Heating Appliance Usage} \\ &+ \text{All-Electric Number of Customers} / \text{Total Number of Customers} \\ &\quad \times \text{Total Usage for Non Space Heating Appliances} \end{aligned}$$

Standard Usage (GW.h)

$$\begin{aligned} &= \text{Number of Standard Customers} / \text{Total Number of Customers} \\ &\quad \times \text{Total Usage for Non Space Heating Appliances} \end{aligned}$$

Total Residential Usage (GW.h)

$$= \text{All-Electric Customer Usage} + \text{Standard Customer Usage}$$

Table 6

BASIC RESIDENTIAL SALES Base Forecast 1998/99 - 2029/30										
Fiscal Year	Basic Standard			Basic All-Electric			Total Basic			MSE
	(Mtrs.)	(GW.h)	(Avg.)	(Mtrs.)	(GW.h)	(Avg.)	(Mtrs.)	(GW.h)	(Avg.)	
1998/99	287368	2609	9079	117110	2774	23691	404478	5384	13310	29.0%
1999/00	289419	2607	9008	117506	2757	23460	406925	5364	13181	28.9%
2000/01	290679	2736	9413	118411	3001	25346	409090	5737	14025	28.9%
2001/02	291371	2771	9512	120285	2902	24128	411656	5674	13783	29.2%
2002/03	292032	2977	10193	121780	3289	27011	413812	6266	15142	29.4%
2003/04	293020	3019	10304	123671	3151	25481	416691	6170	14808	29.7%
2004/05	294108	2991	10171	126027	3283	26053	420135	6275	14935	30.0%
2005/06	295733	3045	10295	128009	3126	24419	423742	6171	14562	30.2%
2006/07	297137	3167	10660	130749	3275	25050	427886	6443	15057	30.6%
2007/08	298287	3237	10852	133858	3499	26139	432145	6736	15587	31.0%
2008/09	299852	3243	10815	137410	3604	26231	437262	6847	15659	31.4%
2009/10	301627	3249	10772	139847	3505	25061	441474	6754	15299	31.7%
2010/11	303313	3271	10785	142204	3563	25055	445517	6834	15340	31.9%
2011/12	304912	3294	10804	144622	3624	25056	449534	6918	15389	32.2%
2012/13	306459	3319	10829	147064	3686	25065	453523	7005	15445	32.4%
2013/14	307982	3344	10857	149504	3749	25077	457486	7093	15504	32.7%
2014/15	309491	3370	10888	151929	3812	25094	461420	7182	15566	32.9%
2015/16	310995	3397	10922	154331	3876	25113	465326	7272	15628	33.2%
2016/17	312502	3425	10959	156700	3939	25137	469202	7364	15694	33.4%
2017/18	314016	3454	10998	159035	4002	25163	473051	7455	15760	33.6%
2018/19	315533	3484	11041	161336	4065	25193	476869	7548	15829	33.8%
2019/20	317055	3515	11085	163604	4127	25226	480659	7642	15898	34.0%
2020/21	318585	3547	11132	165836	4189	25262	484421	7736	15969	34.2%
2021/22	320124	3580	11183	168030	4252	25302	488154	7831	16043	34.4%
2022/23	321672	3615	11238	170184	4314	25347	491856	7929	16120	34.6%
2023/24	323230	3651	11296	172301	4376	25396	495531	8027	16199	34.8%
2024/25	324796	3689	11357	174380	4438	25448	499176	8126	16279	34.9%
2025/26	326371	3727	11420	176421	4499	25503	502792	8226	16362	35.1%
2026/27	327954	3767	11486	178425	4561	25560	506379	8327	16445	35.2%
2027/28	329546	3808	11554	180392	4622	25621	509938	8429	16530	35.4%
2028/29	331147	3849	11624	182321	4683	25684	513468	8532	16616	35.5%
2029/30	332760	3892	11697	184218	4744	25750	516978	8636	16704	35.6%

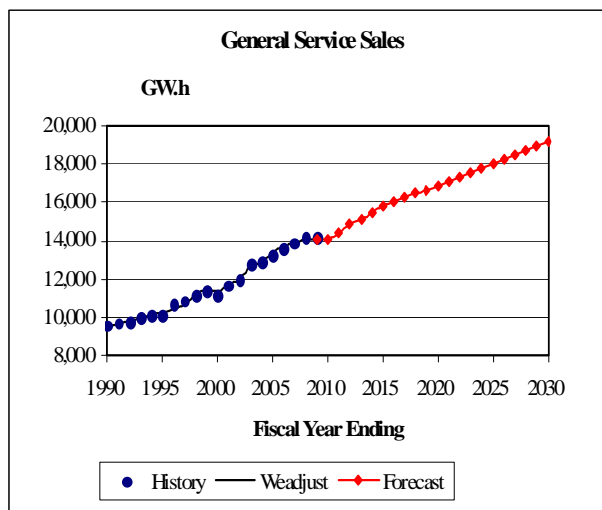
Table 7

TOTAL RESIDENTIAL SALES						
Base Forecast						
1998/99 - 2029/30						
Fiscal Year	Basic (GW.h)	Diesel (GW.h)	Seasonal (GW.h)	FRWH (GW.h)	Total Residential (GW.h)	Change (%)
1998/99	5384	11	44	43	5482	0.2%
1999/00	5364	5	46	40	5455	-0.5%
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	6754	8	78	24	6864	-1.3%
2010/11	6834	8	81	23	6946	1.2%
2011/12	6918	8	83	22	7031	1.2%
2012/13	7005	8	85	21	7119	1.3%
2013/14	7093	8	87	20	7208	1.3%
2014/15	7182	9	89	19	7298	1.3%
2015/16	7272	9	91	18	7389	1.2%
2016/17	7364	9	92	17	7482	1.3%
2017/18	7455	9	94	16	7575	1.2%
2018/19	7548	9	96	15	7669	1.2%
2019/20	7642	9	98	14	7764	1.2%
2020/21	7736	9	100	14	7859	1.2%
2021/22	7831	10	102	13	7956	1.2%
2022/23	7929	10	104	12	8055	1.2%
2023/24	8027	10	106	12	8155	1.2%
2024/25	8126	10	108	11	8256	1.2%
2025/26	8226	10	110	11	8358	1.2%
2026/27	8327	10	112	10	8460	1.2%
2027/28	8429	10	115	10	8564	1.2%
2028/29	8532	11	117	9	8668	1.2%
2029/30	8636	11	119	9	8774	1.2%

GENERAL SERVICE

The General Service sector represents 66% of all sales in Manitoba. This classification includes sales to all Commercial and Industrial businesses in Manitoba. This sector consists of six forecast groups (Mass Market, Top Consumers, Diesel, Seasonal, Water Heating and Surplus Energy Program). The last four groups represent 0.3% of all General Service sales. The adjacent graph shows continuous load growth over the last twenty years, except for slight downturns in 1999/00 and 2008/09.

Figure 5



The General Service sector is forecast to increase from a weather adjusted base of 14,100 GW.h in 2008/09 to 19,130 GW.h by 2029/30. This represents an average growth of 240 GW.h per year, which is 9% lower than the ten year annual growth rate of 264 GW.h per year.

GENERAL SERVICE (GW.h)					
HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Sales	Weather Adjust	Adjusted Sales	Fiscal Year	Forecast Sales
1988/89	9458	-114	9343	2009/10	14056
1989/90	9574	-80	9494	2010/11	14412
1990/91	9689	-55	9634	2011/12	14831
1991/92	9772	21	9793	2012/13	15136
1992/93	9954	-15	9939	2013/14	15400
1993/94	10126	-38	10088	2014/15	15848
1994/95	10120	127	10247	2015/16	16067
1995/96	10659	-215	10444	2016/17	16287
1996/97	10855	-217	10638	2017/18	16468
1997/98	11121	46	11167	2018/19	16617
1998/99	11360	103	11463	2019/20	16840
1999/00	11152	177	11330	2020/21	17064
2000/01	11673	-5	11668	2021/22	17288
2001/02	11951	44	11994	2022/23	17513
2002/03	12796	-144	12652	2023/24	17737
2003/04	12923	-24	12898	2024/25	17962
2004/05	13274	39	13313	2025/26	18193
2005/06	13577	106	13683	2026/27	18424
2006/07	13870	-46	13823	2027/28	18658
2007/08	14123	-58	14065	2028/29	18893
2008/09	14154	-54	14100	2029/30	19130

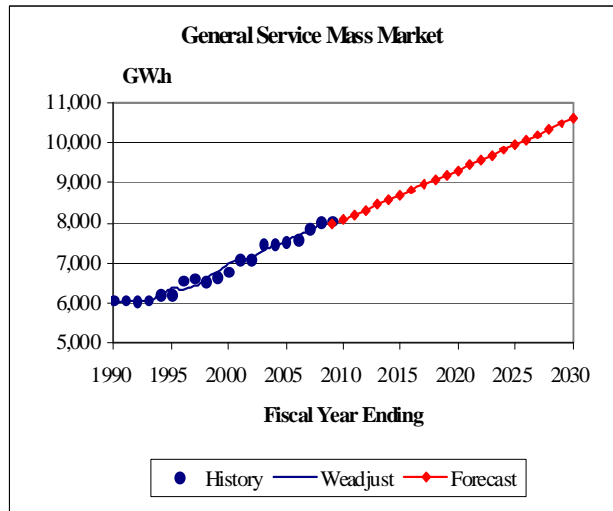
General Service Mass Market

This category includes all other Commercial and Industrial businesses located in Manitoba, excluding the Top Consumers group.

The Mass Market load has grown steadily throughout the last twenty years, except during the economic downturn of the early 1990's. This load generally does not fluctuate dramatically since many of the larger customers in this group are established businesses.

The Mass Market category is forecast to increase from 8,049 GWh in 2008/09 to 10,601 GWh by 2029/30. This represents an average growth of 122 GWh per year, which is lower than the ten year growth rate of 138 GWh per year. The Mass Market forecast is based on expectations of no GDP growth in 2009/10 but steady economic growth in subsequent years and moderate increases in real electricity and natural gas prices.

Figure 6



Methodology

Econometric analysis of sales data is used to develop models for the number of customers and the average use per customer. Forecasts of Manitoba GDP and energy prices by the Economic Analysis Department are then input into the models, which generate forecasts for the number of customers and average use for each year of the forecast period. The forecasts for customers and average use are multiplied together to generate total GWh. The expected savings from Manitoba Hydro's effect on changes to codes and standards are subtracted resulting in the final forecast.

Total use is allocated to the Small, Medium and Large rate classes according to each group's proportion of the total Mass Market sector (as recorded for the most recent fiscal year).

Customer Forecast

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

$$\begin{aligned} \text{Number of Customers (t)} &= \text{Number of Customers (t-1)} \\ &+ \text{Change in the Number of Customers (t)} \end{aligned}$$

$$\begin{aligned} \text{Change in the Number of Customers (t)} &= \text{Number of Customers (t-1)} \\ &\times \text{Percentage Change in Number of Customers (t)} \end{aligned}$$

The percentage change in number of customers is modeled using year-end historical customer data from 1991/92 to 2008/09. The resulting model and parameters are as follows:

$$\begin{aligned} \text{Percentage Change in Number of Customers (t)} &= 0.0023 + 0.13171 \times \text{CGDP} \end{aligned}$$

CGDP - Annual Percentage Change in Manitoba Gross Domestic Product

R-squared: 29.6%

T-stats:

Constant (0.0023)	: 1.79
CGDP	: 2.59

Average Use Forecast

The average monthly use per customer is forecast using the following model:

Change in Monthly Average Use

$$= 68.7 - 60.126 \times \text{CPENG} + 1,555.6 \times \text{CGDP} + 2.793 \times \text{CDDH} + 7.635 \times \text{CDDC}$$

CPENG - Annual % Change in (Price of Electricity / Price of Natural Gas)

CGDP - Annual % Change in Manitoba Gross Domestic Product

CDDH - Year over Year Change in Degree Days Heating by Month

CDDC - Year over Year Change in Degree Days Cooling by Month

R-squared: 57.1%

T-stats:

Constant (68.7) : 1.84

CPENG : -0.29

CGDP : 0.98

CDDH : 15.69

CDDC : 6.29

The monthly model is aggregated to the annual level for forecasting purposes.

Annual Average Use (t)

= Annual Average Use (t-1)

+ Change in Annual Average Use (t)

Total Use Forecast

Total Use (t)

= Number of Customers (t)

x Average Annual Use (t)

General Service Top Consumers

This category includes the top energy consuming businesses in Manitoba and represents 43% of all electricity consumed in the General Service sector. The Top Consumers group includes 16 customers in the Primary Metals, Chemicals, Petrol/Oil/Natural Gas, Pulp/Paper, Food/Beverage, Mining and Colleges/Universities. The Top Consumers category includes all future energy requirements for these customers. Some customers are planning major expansions, some customers are expected to remain at current operating levels and some customers are planning to reduce their levels of consumption in the future.

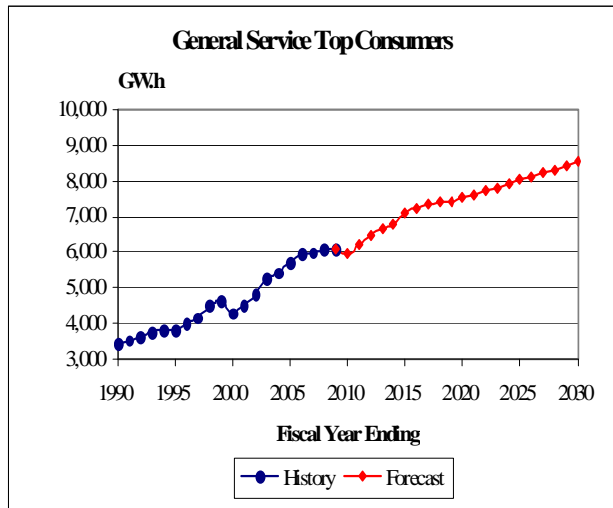
This category contains some speculative load growth because new, large, Industrial customers will be energized to the Manitoba system in the future. Therefore, starting in 2012/13, we have created a classification called Potential Large Industrial Loads. This classification is used to represent the load requirements of potential Industrial loads that will be energized throughout the forecast period, but at this time, these loads are unspecified. Since 1980/81, seven new major Industrial loads have been energized in Manitoba. Patterns of past unexpected load growth have been used to forecast future potential loads.

Each customer in the Top Consumers group is forecasted 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.

The Top Consumers are forecast individually because 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 adjacent graph shows that the Top Consumers category has grown consistently over the last twenty years, except for a downturn in 1999/00. The current fiscal year has shown a drop in the consumption of many of the Top Consumers due to the recent global economic downturn. In general, Top Consumer recovery is expected in the next two years and then return to normal growth.

Figure 7



The Top Consumer category is forecast to increase from a base of 6,065 GW.h in 2008/09 to 8,513 GW.h by 2029/30. This represents an average growth of 117 GW.h per year. This is 19% less than the ten year annual growth rate of 143 GW.h per year between 1998/99 of 4,632 GW.h and 2008/09.

General Service Diesel

The Diesel Full Cost classification consumed 5.3 GW.h in 2008/09. Consumption is expected to increase to 7.8 GW.h by 2029/30.

General Service Seasonal

There were 822 General Service Seasonal customers as of March, 2009. The number of customers is expected to increase by five customers per year throughout the forecast period. Sales were 4.6 GW.h in 2008/09 and are expected to grow to 5.2 GW.h by 2029/30.

General Service Water Heating

General Service Water Heating is a flat rate unmetered service that has not been available since November 12, 1969. There were 470 remaining customers as of March, 2009. The number of customers is expected to decrease 5% per year throughout the forecast period. Sales were 8.3 GW.h in 2008/09 and that will decrease to 2.9 GW.h by 2029/30.

Surplus Energy Program

Participants in the Surplus Energy Program (SEP) are expected to consume 22 GW.h per year during the 2009/10 to 2012/13 period, as the program has only been approved until March 2013. This energy is not included in firm load.

Table 8

BASIC GENERAL SERVICE SALES									
Base Forecast									
1998/99 - 2029/30									
Fiscal Year	Mass Market			Top Consumers			Total Basic		
	(Mtrs.)	(GW.h)	(Avg.)	(Mtrs.)	(GW.h)	(Avg.)	(Mtrs.)	(GW.h)	(Avg.)
1998/99	59040	6668	112943	34	4632	136243341	59074	11300	191293
1999/00	59494	6796	114232	35	4299	122833677	59529	11095	186385
2000/01	59759	7110	118970	31	4515	145639850	59790	11624	194420
2001/02	60086	7084	117902	25	4818	192739001	60111	11903	198013
2002/03	60265	7467	123900	26	5282	203139444	60291	12748	211449
2003/04	60672	7460	122955	27	5423	200857671	60699	12883	212245
2004/05	60924	7516	123362	26	5714	219774330	60950	13230	217060
2005/06	61491	7587	123380	26	5948	228753323	61517	13534	220009
2006/07	63596	7839	123269	26	5989	230346465	63622	13828	217353
2007/08	63855	8006	125382	26	6075	233643398	63881	14081	220425
2008/09	64140	8049	125485	26	6065	233277664	64166	14114	219958
2009/10	64519	8059	124916	25	5956	238256000	64544	14016	217152
2010/11	64761	8183	126361	25	6196	247840000	64786	14379	221951
2011/12	65117	8316	127703	25	6482	259280000	65142	14798	227160
2012/13	65498	8447	128961	25	6657	266280000	65523	15104	230510
2013/14	65888	8587	130334	26	6795	261346154	65914	15382	233372
2014/15	66227	8705	131447	26	7126	274076923	66253	15831	238953
2015/16	66552	8824	132589	26	7226	277923077	66578	16050	241072
2016/17	66881	8944	133730	26	7326	281769231	66907	16270	243174
2017/18	67210	9065	134874	26	7386	284076923	67236	16451	244674
2018/19	67540	9187	136029	26	7413	285115385	67566	16600	245692
2019/20	67873	9311	137182	26	7513	288961538	67899	16824	247779
2020/21	68206	9435	138332	26	7613	292807692	68232	17048	249855
2021/22	68537	9559	139469	26	7713	296653846	68563	17272	251911
2022/23	68863	9684	140621	26	7813	300500000	68889	17497	253982
2023/24	69186	9808	141762	26	7913	304346154	69212	17721	256038
2024/25	69510	9933	142905	26	8013	308192308	69536	17946	258087
2025/26	69834	10064	144109	26	8113	312038462	69860	18177	260188
2026/27	70160	10195	145315	26	8213	315884615	70186	18408	262279
2027/28	70488	10329	146538	26	8313	319730769	70514	18642	264376
2028/29	70815	10464	147769	26	8413	323576923	70841	18877	266474
2029/30	71145	10601	149003	26	8513	327423077	71171	19114	268562

Table 9

TOTAL GENERAL SERVICE SALES								
Base Forecast								
1998/99 - 2029/30								
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 (%)
1998/99	6668	4632	9	5	15	30	11360	2.2%
1999/00	6796	4299	4	5	15	33	11152	-1.8%
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	8059	5956	6	5	8	22	14056	-0.7%
2010/11	8183	6196	6	5	8	15	14412	2.5%
2011/12	8316	6482	6	5	7	15	14831	2.9%
2012/13	8447	6657	6	5	7	15	15136	2.1%
2013/14	8587	6795	6	5	6	0	15400	1.7%
2014/15	8705	7126	6	5	6	0	15848	2.9%
2015/16	8824	7226	6	5	6	0	16067	1.4%
2016/17	8944	7326	6	5	6	0	16287	1.4%
2017/18	9065	7386	7	5	5	0	16468	1.1%
2018/19	9187	7413	7	5	5	0	16617	0.9%
2019/20	9311	7513	7	5	5	0	16840	1.3%
2020/21	9435	7613	7	5	5	0	17064	1.3%
2021/22	9559	7713	7	5	4	0	17288	1.3%
2022/23	9684	7813	7	5	4	0	17513	1.3%
2023/24	9808	7913	7	5	4	0	17737	1.3%
2024/25	9933	8013	7	5	4	0	17962	1.3%
2025/26	10064	8113	7	5	4	0	18193	1.3%
2026/27	10195	8213	8	5	3	0	18424	1.3%
2027/28	10329	8313	8	5	3	0	18658	1.3%
2028/29	10464	8413	8	5	3	0	18893	1.3%
2029/30	10601	8513	8	5	3	0	19130	1.3%

ELECTRIC VEHICLES

This forecast includes an estimate of the future conversion of vehicles to electricity. This combines both Plug-In Hybrid Electric Vehicles (PHEV) which have an electric battery as its primary source of power and a gas engine for backup power and Battery-electric Vehicles (BEV) that are 100% electrically powered.

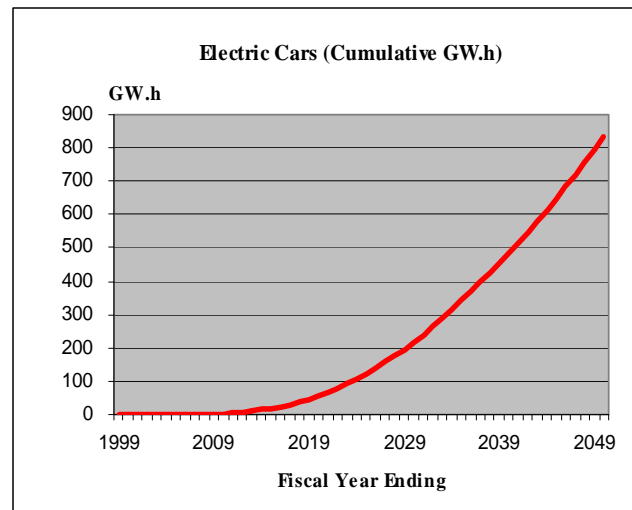
Due to current environmental concerns and economic concerns due to dependence on foreign oil, an effort is being undertaken to have the automotive industry develop electric car technology to become a practical mode of transportation. This work is dependant upon the development and cost of the lithium-ion battery technology so that the range of operation and recharging capabilities make it competitive with gas engines. This technology has been evolving for the past two decades, but is still in its infancy and major breakthroughs are required before this technology can become main-stream.

This forecast assumes the adoption rate specified in the EPRI PRISM Base Case Projected Capacity Growth that is taken from the 2008 EPRI Report 1016853: *Impact of Plug-in Electric Vehicle Technology Diffusion on Electricity Infrastructure*. An average use of 2,477 kW.h per year is assumed, based on 12,000 miles (19,300 km) per vehicle per year, from the same EPRI report.

The forecast is for 500 electric vehicles (one GW.h) in 2009/10 growing to 22,000 electric vehicles (55 GW.h) in 2019/20 and reaching 87,000 electric vehicles (217 GW.h) in 2029/30.

Two thirds of the forecast load is assumed to be residential (and is included in the Residential forecast), and the remaining third is assumed to be commercial (and is included in the General Service Mass Market forecast as a Non-Demand load. This split is to approximate the mix of personal versus business vehicles and whether their electricity will come from home or business.

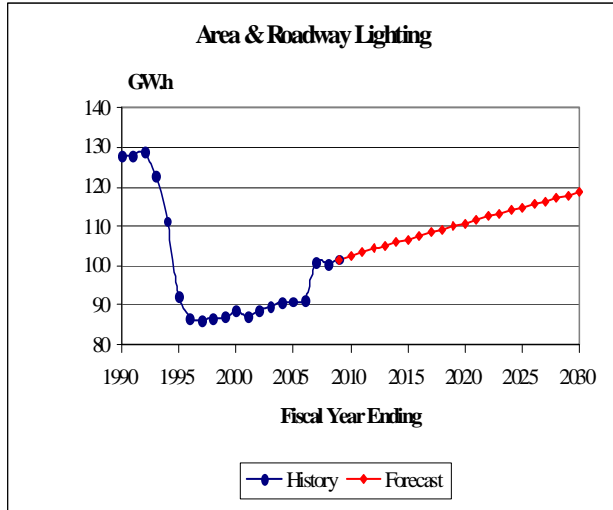
Figure 8



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 classes. The Sentinel Lighting classification is an outdoor lighting service where units are available as rentals to an existing metered service or on an unmetered, flat rate basis. Street Lighting includes all roadway lighting in Manitoba. In the mid 1990's, usage dropped due to conversion to energy-efficient, high-pressure, sodium vapor street lighting.

Figure 9



The Area and Roadway Lighting sector is forecast to increase from 102 GW.h in 2008/09 to 119 GW.h by 2029/30. Sentinel Flat Rates are forecast to increase by 272 customers and 0.15 GW.h per year. Street Lighting is forecast to increase by one GW.h per year.

AREA & ROADWAY LIGHTING (GW.h)					
HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Sales	Weather Adjust	Adjusted Sales	Fiscal Year	Forecast Sales
1988/89	128	0	128	2009/10	103
1989/90	128	0	128	2010/11	103
1990/91	128	0	128	2011/12	104
1991/92	129	0	129	2012/13	105
1992/93	123	0	123	2013/14	106
1993/94	111	0	111	2014/15	107
1994/95	92	0	92	2015/16	108
1995/96	87	0	87	2016/17	108
1996/97	86	0	86	2017/18	109
1997/98	87	0	87	2018/19	110
1998/99	87	0	87	2019/20	111
1999/00	89	0	89	2020/21	112
2000/01	87	0	87	2021/22	112
2001/02	89	0	89	2022/23	113
2002/03	90	0	90	2023/24	114
2003/04	91	0	91	2024/25	115
2004/05	91	0	91	2025/26	116
2005/06	91	0	91	2026/27	116
2006/07	101	0	101	2027/28	117
2007/08	101	0	101	2028/29	118
2008/09	102	0	102	2029/30	119

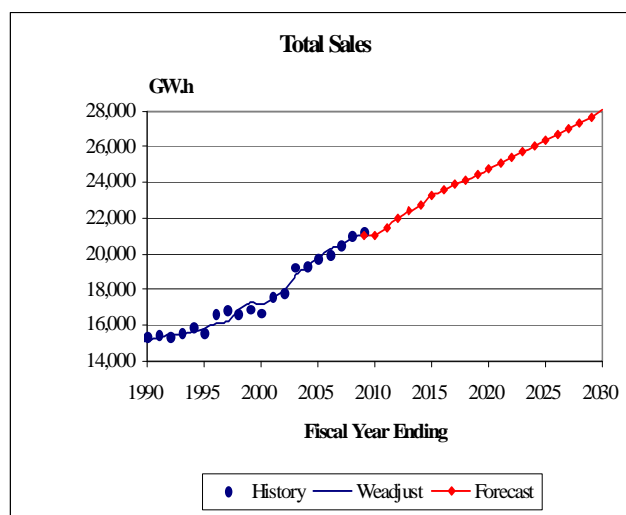
Table 10

AREA AND ROADWAY LIGHTING								
Base Forecast								
1998/99 - 2029/30								
Fiscal Year	Sentinal Flat Rates		Sentinal Rentals		Street Lighting		Total Lighting	
	(Services)	(GW.h)	(Services)	(GW.h)	(Services)	(GW.h)	(Services)	(GW.h)
1998/99	17864	9	5487	0	759	78	24110	87
1999/00	18546	10	5473	0	754	79	24773	89
2000/01	18968	10	5475	0	751	77	25194	87
2001/02	19166	10	5468	0	756	79	25390	89
2002/03	19446	10	5477	0	755	80	25678	90
2003/04	19527	10	5505	0	757	81	25789	91
2004/05	19648	10	5519	0	759	81	25926	91
2005/06	19652	10	7826	0	1014	81	28492	91
2006/07	18669	11	23994	0	2896	90	45559	101
2007/08	18947	11	24272	0	2946	90	46165	101
2008/09	19228	11	24542	0	2988	91	46758	102
2009/10	19547	11	24770	0	3015	91	47332	103
2010/11	19819	11	24947	0	3048	92	47814	103
2011/12	20091	11	25219	0	3081	93	48391	104
2012/13	20363	12	25491	0	3114	93	48968	105
2013/14	20635	12	25763	0	3147	94	49545	106
2014/15	20907	12	26035	0	3180	95	50122	107
2015/16	21179	12	26307	0	3213	96	50699	108
2016/17	21451	12	26579	0	3246	96	51276	108
2017/18	21723	12	26851	0	3279	97	51853	109
2018/19	21995	13	27123	0	3312	97	52430	110
2019/20	22267	13	27395	0	3345	98	53007	111
2020/21	22539	13	27667	0	3378	99	53584	112
2021/22	22811	13	27939	0	3411	99	54161	112
2022/23	23083	13	28211	0	3444	100	54738	113
2023/24	23355	13	28483	0	3477	101	55315	114
2024/25	23627	13	28755	0	3510	101	55892	115
2025/26	23899	14	29027	0	3543	102	56469	116
2026/27	24171	14	29299	0	3576	103	57046	116
2027/28	24443	14	29571	0	3609	103	57623	117
2028/29	24715	14	29843	0	3642	104	58200	118
2029/30	24987	14	30115	0	3675	104	58777	119

TOTAL SALES (GENERAL CONSUMERS)

The Total Sales category consists of all sales delivered to customers in Manitoba. This category includes the total of all sales from the Residential, General Service and Lighting. 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. The adjacent graph shows that Total Sales have grown steadily over the last twenty years.

Figure 10



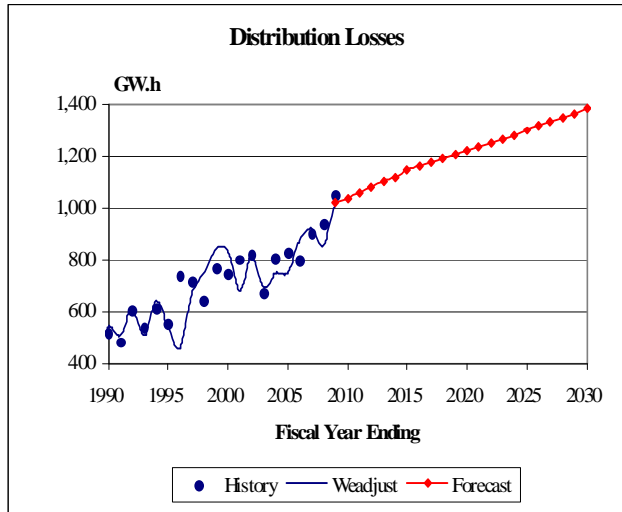
The Total Sales category is forecast to increase from a weather adjusted base of 20,983 GW.h in 2008/09 to 28,002 GW.h by 2029/30. This represents an average growth of 334 GW.h per year, which is 11% lower than the ten year annual growth rate of 374 GW.h. The reasons for growth are previously specified in the Residential and General Service sections of this report.

TOTAL SALES (GW.h)					
HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Sales	Weather Adjust	Adjusted Sales	Fiscal Year	Forecast Sales
1988/89	15127	-211	14916	2009/10	21023
1989/90	15337	-177	15160	2010/11	21462
1990/91	15447	-142	15305	2011/12	21965
1991/92	15397	108	15505	2012/13	22360
1992/93	15577	-95	15482	2013/14	22713
1993/94	15870	-210	15660	2014/15	23253
1994/95	15600	234	15833	2015/16	23564
1995/96	16654	-539	16114	2016/17	23877
1996/97	16851	-617	16234	2017/18	24151
1997/98	16681	140	16821	2018/19	24396
1998/99	16929	310	17239	2019/20	24715
1999/00	16696	472	17167	2020/21	25035
2000/01	17590	-55	17535	2021/22	25357
2001/02	17805	161	17965	2022/23	25681
2002/03	19246	-433	18813	2023/24	26006
2003/04	19280	-34	19246	2024/25	26333
2004/05	19735	33	19769	2025/26	26666
2005/06	19935	346	20280	2026/27	27001
2006/07	20510	-63	20446	2027/28	27339
2007/08	21061	-152	20909	2028/29	27679
2008/09	21210	-227	20983	2029/30	28022

DISTRIBUTION LOSSES

Distribution Losses are the resistance losses incurred in delivering power from the distribution station to the customers' meter. These losses are the difference between Manitoba Load at Common Bus less Construction and Total Sales less Diesel. Diesel sales are excluded because they are not part of the Integrated System. The losses may vary because Total Sales are measured on a cycle billing basis and Common Bus is measured on a calendar month basis. Use at the customers' meter lags the delivery of power to the Common

Figure 11



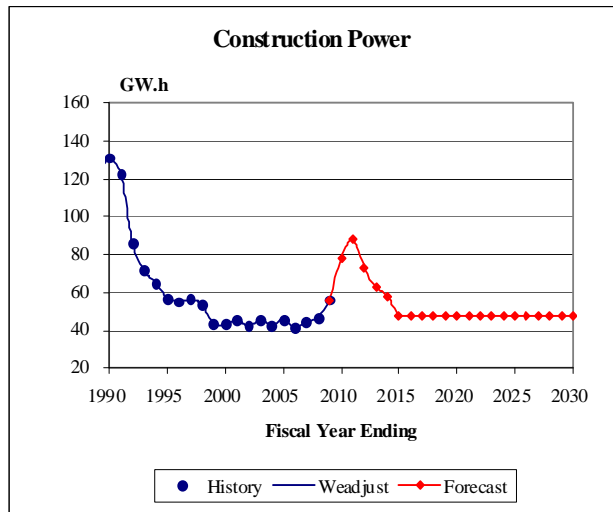
Bus. This category also includes unbilled sales and the error associated with flat rate estimates. Unbilled sales include energy used by Manitoba Hydro offices, Customer Accounting adjustments and energy lost through theft. Flat rate estimates include a number of unmetered services where energy is estimated and subject to inaccuracy. Distribution losses are forecast to be 4.94% of the General Consumers less Diesel Sales.

DISTRIBUTION LOSSES (GW.h)					
HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Losses	Weather Adjust	Adjusted Losses	Fiscal Year	Forecast Losses
1988/89	528	-122	406	2009/10	1037
1989/90	515	25	540	2010/11	1059
1990/91	483	24	507	2011/12	1084
1991/92	606	5	611	2012/13	1103
1992/93	541	-35	506	2013/14	1121
1993/94	614	26	640	2014/15	1147
1994/95	556	-11	545	2015/16	1163
1995/96	740	-281	458	2016/17	1178
1996/97	715	-43	672	2017/18	1192
1997/98	641	106	747	2018/19	1204
1998/99	771	71	841	2019/20	1219
1999/00	749	89	838	2020/21	1235
2000/01	802	-121	681	2021/22	1251
2001/02	819	-2	817	2022/23	1267
2002/03	671	22	693	2023/24	1283
2003/04	804	-55	749	2024/25	1299
2004/05	830	-80	750	2025/26	1316
2005/06	797	78	874	2026/27	1332
2006/07	900	21	922	2027/28	1349
2007/08	940	-86	854	2028/29	1366
2008/09	1052	-34	1018	2029/30	1383

CONSTRUCTION POWER

The Construction Power category 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. This category also includes station service until a plant is commissioned. The adjacent graph shows that consumption increased significantly during the peak of Limestone development. Recently, the Construction figures include about 40-50 GW.h for consumption at the Gillam, Limestone and Kettle town sites.

Figure 12



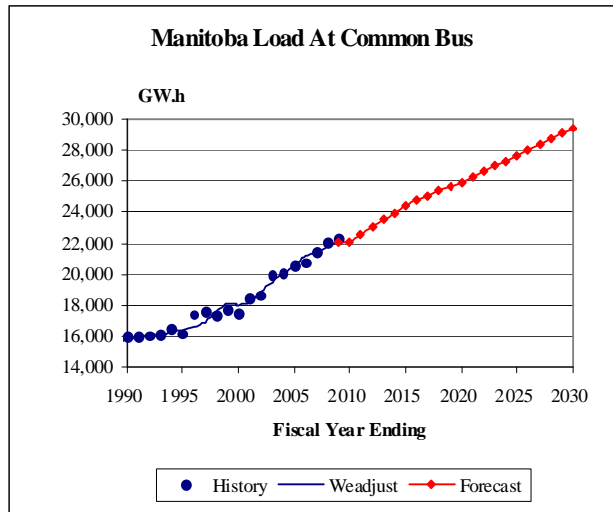
The Construction Power category is forecast to be 48 GW.h per year for the Gillam, Limestone and Kettle town sites. The forecast includes energy consumption estimates for construction of Wuskwatim, which is a committed site. It does not include construction power estimates for any non-committed sites (e.g. Point Du Bois, Conawapa and Keeyask).

CONSTRUCTION POWER (GW.h)					
HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Usage	Weather Adjust	Adjusted Usage	Fiscal Year	Forecast Usage
1988/89	123	0	123	2009/10	78
1989/90	131	0	131	2010/11	88
1990/91	123	0	123	2011/12	73
1991/92	86	0	86	2012/13	63
1992/93	72	0	72	2013/14	58
1993/94	65	0	65	2014/15	48
1994/95	57	0	57	2015/16	48
1995/96	55	0	55	2016/17	48
1996/97	56	0	56	2017/18	48
1997/98	54	0	54	2018/19	48
1998/99	43	0	43	2019/20	48
1999/00	43	0	43	2020/21	48
2000/01	46	0	46	2021/22	48
2001/02	42	0	42	2022/23	48
2002/03	46	0	46	2023/24	48
2003/04	43	0	43	2024/25	48
2004/05	46	0	46	2025/26	48
2005/06	42	0	42	2026/27	48
2006/07	45	0	45	2027/28	48
2007/08	47	0	47	2028/29	48
2008/09	56	0	56	2029/30	48

MANITOBA LOAD AT COMMON BUS

Manitoba Load at Common Bus represents the total load measured from all the distribution points within Manitoba. This classification includes all sales to Manitoba customers plus associated distribution losses, but excludes transmission losses and station service.

Figure 13



The Manitoba Load at Common Bus category is forecast to increase from a weather adjusted base of 22,045 GW.h in 2008/09 to 29,434 GW.h by 2029/30.

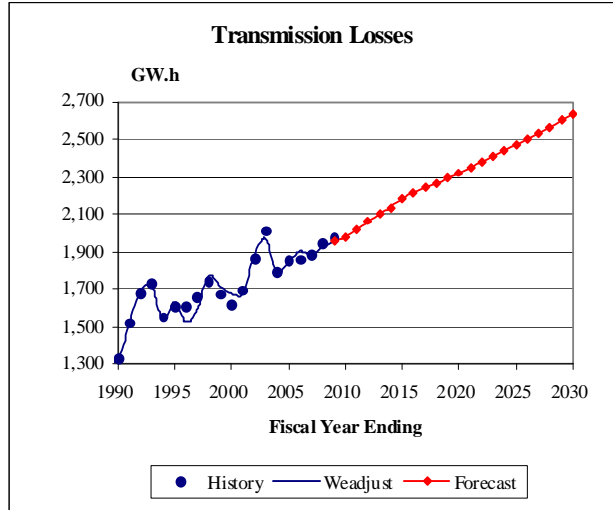
This represents an average growth of 352 GW.h per year, which is 11% lower than the ten year annual growth rate of 394 GW.h.

MANITOBA HYDRO AT COMMON BUS (GW.h) HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Energy	Weather Adjust	Adjusted Energy	Fiscal Year	Forecast Energy
1988/89	15760	-333	15427	2009/10	22125
1989/90	15964	-152	15811	2010/11	22595
1990/91	16031	-118	15913	2011/12	23108
1991/92	16067	113	16180	2012/13	23512
1992/93	16166	-130	16036	2013/14	23878
1993/94	16523	-184	16339	2014/15	24434
1994/95	16185	223	16408	2015/16	24759
1995/96	17418	-821	16597	2016/17	25088
1996/97	17590	-660	16930	2017/18	25376
1997/98	17350	246	17595	2018/19	25632
1998/99	17722	381	18103	2019/20	25966
1999/00	17479	561	18040	2020/21	26302
2000/01	18428	-176	18252	2021/22	26639
2001/02	18655	159	18813	2022/23	26979
2002/03	19953	-411	19542	2023/24	27320
2003/04	20116	-88	20027	2024/25	27663
2004/05	20600	-47	20553	2025/26	28012
2005/06	20761	423	21184	2026/27	28363
2006/07	21442	-42	21400	2027/28	28718
2007/08	22036	-238	21798	2028/29	29075
2008/09	22305	-261	22045	2029/30	29434

TRANSMISSION LOSSES

Transmission Losses category represents the amount of energy that is lost in delivering power from the generation stations to all of the distribution points on the Common Bus. This category only contains losses associated with supplying Manitoba customers. Losses attributable to exports and the gains attributable to imports are excluded. It is calculated as the difference between Net Total Energy minus the Manitoba Load at Common Bus. 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 HVDC transformer failures.

Figure 14



Transmission Losses are forecasted to be 8.94% of the Manitoba Load at Common Bus on an annual basis. The percentage varies month to month but is the same for every year of the forecast.

TRANSMISSION LOSSES (GW.h)					
HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Losses	Weather Adjust	Adjusted Losses	Fiscal Year	Forecast Losses
1988/89	1348	-33	1315	2009/10	1978
1989/90	1334	-15	1319	2010/11	2020
1990/91	1522	-12	1510	2011/12	2066
1991/92	1680	11	1692	2012/13	2102
1992/93	1728	-13	1715	2013/14	2135
1993/94	1552	-18	1534	2014/15	2184
1994/95	1609	22	1632	2015/16	2213
1995/96	1606	-82	1524	2016/17	2243
1996/97	1660	-66	1594	2017/18	2268
1997/98	1745	25	1770	2018/19	2291
1998/99	1675	38	1714	2019/20	2321
1999/00	1623	56	1679	2020/21	2351
2000/01	1696	-18	1678	2021/22	2381
2001/02	1864	16	1880	2022/23	2412
2002/03	2012	-41	1971	2023/24	2442
2003/04	1792	-9	1783	2024/25	2473
2004/05	1852	-5	1847	2025/26	2504
2005/06	1860	42	1903	2026/27	2536
2006/07	1885	-4	1881	2027/28	2567
2007/08	1949	-24	1925	2028/29	2599
2008/09	1979	-26	1953	2029/30	2631

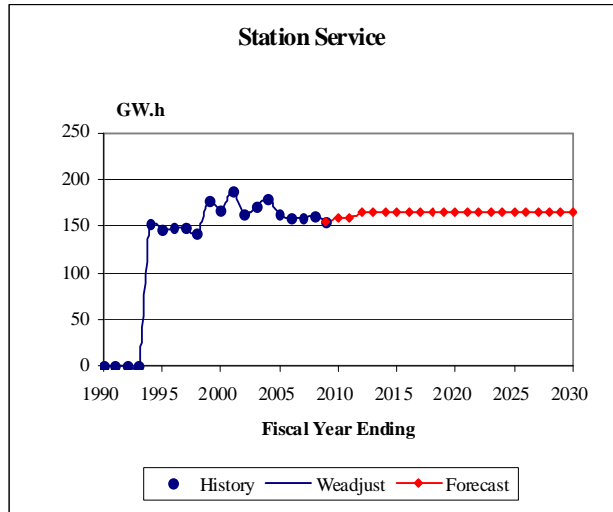
Table 11

MONTHLY TRANSMISSION LOSSES (GW.h)													
Base Forecast													
2008/09 - 2029/30													
Fiscal Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
2008/09 Actual	157	141	139	150	158	150	165	177	200	199	161	184	1979
2009/10	158	156	152	168	162	148	162	168	181	184	166	172	1978
2010/11	161	160	155	172	165	151	165	172	185	188	170	175	2020
2011/12	165	163	158	176	169	155	169	176	189	193	174	179	2066
2012/13	168	166	161	179	172	157	172	179	192	196	177	182	2102
2013/14	171	169	163	181	175	160	175	182	195	199	180	185	2135
2014/15	175	172	167	185	179	163	179	186	200	204	184	190	2184
2015/16	177	175	169	188	181	165	181	189	203	207	187	192	2213
2016/17	179	177	172	190	183	168	184	191	205	210	189	195	2243
2017/18	181	179	173	192	185	169	186	193	208	212	191	197	2268
2018/19	183	181	175	194	187	171	188	195	210	214	193	199	2291
2019/20	186	183	177	197	190	173	190	198	213	217	196	202	2321
2020/21	188	185	180	199	192	175	192	200	215	220	199	205	2351
2021/22	190	188	182	202	195	178	195	203	218	223	201	207	2381
2022/23	193	190	184	204	197	180	197	206	221	226	204	210	2412
2023/24	195	193	186	207	199	182	200	208	224	228	207	213	2442
2024/25	198	195	189	209	202	184	202	211	227	231	209	215	2473
2025/26	200	197	191	212	204	187	205	214	230	234	212	218	2504
2026/27	203	200	193	215	207	189	207	216	233	237	215	221	2536
2027/28	205	202	196	217	209	191	210	219	236	240	217	224	2567
2028/29	208	205	198	220	212	194	212	222	239	243	220	227	2599
2029/30	210	207	201	223	215	196	215	225	242	246	223	230	2631

STATION SERVICE

The Station Service category measures 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. This is explained in the Glossary of Terms. Station Service energy was not measured prior to 1993/94 and was included in the Transmission Losses category.

Figure 15



Station Service energy is forecast to be 159 GW.h prior to Wuskwatim. Starting in 2011/12, Wuskwatim is included and the Station Service energy is forecast to be 164 GW.h throughout the remainder of the forecast period. Station Service for non-committed sites (e.g. Point Du Bois, Conawapa and Keeyask) are not included in the forecast.

STATION SERVICE (GW.h)					
HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Usage	Weather Adjust	Adjusted Usage	Fiscal Year	Forecast Usage
1988/89	0	0	0	2009/10	159
1989/90	0	0	0	2010/11	159
1990/91	0	0	0	2011/12	164
1991/92	0	0	0	2012/13	164
1992/93	0	0	0	2013/14	164
1993/94	152	0	152	2014/15	164
1994/95	146	0	146	2015/16	164
1995/96	148	0	148	2016/17	164
1996/97	148	0	148	2017/18	164
1997/98	142	0	142	2018/19	164
1998/99	177	0	177	2019/20	164
1999/00	167	0	167	2020/21	164
2000/01	187	0	187	2021/22	164
2001/02	162	0	162	2022/23	164
2002/03	170	0	170	2023/24	164
2003/04	179	0	179	2024/25	164
2004/05	163	0	163	2025/26	164
2005/06	158	0	158	2026/27	164
2006/07	159	0	159	2027/28	164
2007/08	161	0	161	2028/29	164
2008/09	154	0	154	2029/30	164

Table 12

MONTHLY STATION SERVICE ENERGY (GW.h) Base Forecast 2008/09 - 2029/30													
Fiscal Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
2008/09 Actual	13.8	9.4	7.5	9.5	10.4	7.1	10.6	15.1	20.1	20.4	14.9	15.5	154.2
2009/10 - 2010/11	12.9	10.4	8.7	9.2	8.8	7.9	11.0	15.4	17.8	18.5	19.6	18.6	158.7
2011/12 - 2029/30	13.3	10.8	9.0	9.5	9.1	8.2	11.4	15.9	18.5	19.1	20.3	19.3	164.4

Table 13

MONTHLY STATION SERVICE PEAK (MW) Base Forecast 2008/09 - 2029/30													
Fiscal Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Annual
2008/09 Actual	24	15	7	15	17	10	19	24	31	32	26	24	32
2009/10 - 2010/11	22	15	13	17	14	13	18	26	30	28	32	27	30
2011/12 - 2029/30	23	16	13	18	15	13	19	27	31	29	33	28	31

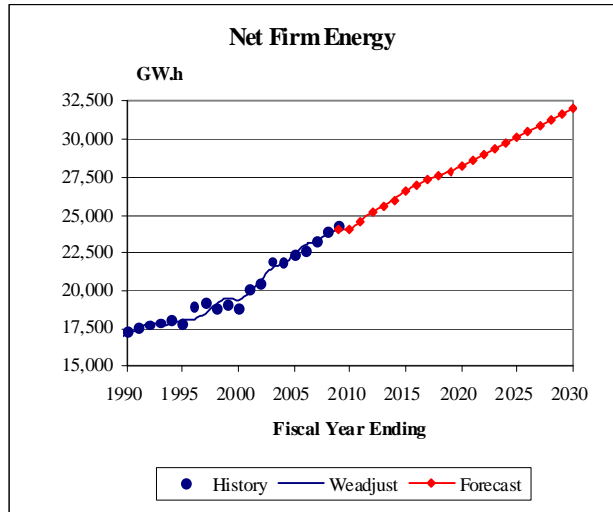
NET FIRM ENERGY

The Net Firm Energy category includes all electricity that is generated to meet the firm energy requirements of all customers within Manitoba except for station service. It excludes interruptible (non-firm) loads.

Net Firm Energy has grown steadily during the past twenty years, except for the economic slow down in the early 1990's and the recent slowdown in 2008.

The Net Firm Energy category is forecast to increase from a weather adjusted base of 23,994 GW.h in 2008/09 to 32,066 GW.h by 2029/30. This represents an average growth of 384 GW.h per year, which is 15% lower than the ten year annual growth rate of 451 GW.h.

Figure 16



NET FIRM ENERGY (GW.h)					
HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Energy	Weather Adjust	Adjusted Energy	Fiscal Year	Forecast Energy
1988/89	17108	-348	16760	2009/10	24080
1989/90	17298	-162	17136	2010/11	24600
1990/91	17553	-126	17427	2011/12	25159
1991/92	17748	120	17868	2012/13	25599
1992/93	17894	-148	17746	2013/14	26012
1993/94	18048	-229	17820	2014/15	26618
1994/95	17784	232	18016	2015/16	26973
1995/96	19000	-863	18138	2016/17	27331
1996/97	19173	-687	18486	2017/18	27644
1997/98	18872	253	19125	2018/19	27923
1998/99	19095	390	19486	2019/20	28288
1999/00	18804	597	19401	2020/21	28654
2000/01	20075	-186	19888	2021/22	29021
2001/02	20494	167	20661	2022/23	29391
2002/03	21940	-438	21502	2023/24	29762
2003/04	21890	-105	21785	2024/25	30136
2004/05	22426	-31	22395	2025/26	30516
2005/06	22598	446	23044	2026/27	30899
2006/07	23305	-52	23253	2027/28	31285
2007/08	23961	-249	23712	2028/29	31674
2008/09	24262	-268	23994	2029/30	32066

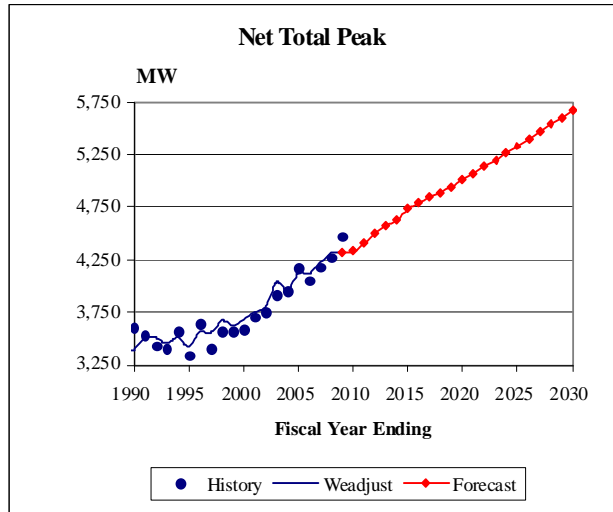
Table 14

MONTHLY NET FIRM ENERGY (GW.h)													
Base Forecast													
2008/09 - 2029/30													
Fiscal Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
2008/09 Actual	1868	1727	1655	1721	1777	1674	1864	2139	2632	2681	2211	2315	24262
2009/10	1835	1729	1687	1807	1772	1688	1905	2107	2435	2572	2284	2261	24080
2010/11	1875	1766	1722	1845	1810	1723	1946	2153	2488	2628	2334	2310	24600
2011/12	1917	1806	1762	1888	1852	1763	1990	2202	2544	2687	2386	2362	25159
2012/13	1951	1838	1793	1921	1884	1794	2025	2240	2588	2734	2428	2403	25599
2013/14	1982	1868	1822	1951	1914	1823	2058	2276	2630	2778	2468	2443	26012
2014/15	2028	1912	1865	1997	1959	1865	2106	2329	2690	2842	2525	2499	26618
2015/16	2056	1937	1889	2024	1985	1890	2134	2360	2726	2880	2559	2533	26973
2016/17	2083	1963	1914	2051	2012	1915	2162	2391	2763	2919	2593	2566	27331
2017/18	2107	1985	1936	2074	2035	1937	2187	2419	2794	2952	2622	2596	27644
2018/19	2128	2005	1956	2095	2055	1956	2209	2443	2822	2982	2649	2622	27923
2019/20	2156	2032	1981	2122	2082	1982	2238	2475	2859	3021	2684	2656	28288
2020/21	2184	2058	2007	2150	2109	2008	2267	2507	2896	3060	2718	2691	28654
2021/22	2212	2084	2033	2177	2136	2033	2296	2539	2933	3099	2753	2725	29021
2022/23	2240	2111	2059	2205	2163	2059	2325	2572	2971	3139	2788	2760	29391
2023/24	2268	2137	2085	2233	2190	2085	2354	2604	3008	3178	2824	2795	29762
2024/25	2297	2164	2111	2261	2218	2111	2384	2637	3046	3218	2859	2830	30136
2025/26	2325	2192	2137	2289	2246	2138	2414	2670	3085	3259	2895	2866	30516
2026/27	2355	2219	2164	2318	2274	2165	2444	2704	3123	3300	2932	2902	30899
2027/28	2384	2247	2191	2347	2302	2192	2475	2737	3162	3341	2968	2938	31285
2028/29	2414	2275	2218	2376	2331	2219	2505	2771	3202	3383	3005	2975	31674
2029/30	2444	2303	2246	2406	2360	2246	2536	2806	3241	3425	3042	3012	32066
- See the Glossary of Terms for a definition of Net Firm Energy													

NET TOTAL PEAK

The Net Total Peak is defined to be the maximum integrated hourly load at generation adjusted for losses associated with exports or imports, less station service, but with curtailed loads added back in. The term "integrated" indicates that the average load within that peak hour is used. The Net Total Peak did not grow very much during the 1990's because many of our large Industrial customers improved their operational efficiency. Manitoba Hydro is very diligent in helping our Industrial customers to improve the efficiency of their business operations. Since 2001, Net Total Peak has started to grow again as improvements in operational efficiency become more difficult to obtain.

Figure 17



The Net Total Peak is forecast to increase from a weather adjusted base of 4,324 MW in 2008/09 to 5,675 MW by 2029/30. This represents an average growth of 64 MW per year, compared to the historical ten year annual growth rate of 69 MW.

NET TOTAL PEAK (MW)					
HISTORICAL/WEATHER ADJUSTMENT/FORECAST					
Fiscal Year	Peak	Weather Adjust	Adjusted Peak	Fiscal Year	Forecast Peak
1988/89	3403	-16	3387	2009/10	4333
1989/90	3611	-218	3393	2010/11	4407
1990/91	3542	-30	3512	2011/12	4499
1991/92	3435	78	3513	2012/13	4570
1992/93	3404	50	3454	2013/14	4633
1993/94	3567	-51	3516	2014/15	4733
1994/95	3342	85	3427	2015/16	4789
1995/96	3649	-81	3568	2016/17	4845
1996/97	3408	145	3553	2017/18	4893
1997/98	3573	101	3674	2018/19	4942
1998/99	3572	58	3630	2019/20	5007
1999/00	3588	94	3682	2020/21	5071
2000/01	3706	49	3755	2021/22	5136
2001/02	3759	40	3799	2022/23	5202
2002/03	3915	124	4039	2023/24	5268
2003/04	3958	2	3960	2024/25	5334
2004/05	4169	-40	4129	2025/26	5401
2005/06	4054	64	4118	2026/27	5469
2006/07	4183	41	4224	2027/28	5537
2007/08	4273	39	4312	2028/29	5606
2008/09	4477	-153	4324	2029/30	5675

Table 15

MONTHLY NET TOTAL PEAK (MW)													
Base Forecast													
2008/09 - 2029/30													
Fiscal Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
2008/09 Actual	3197	2878	2945	2905	3093	2716	3140	3781	4396	4477	4170	4199	4477
2009/10	3277	2901	3107	3160	3135	2950	3234	3738	4206	4297	4190	3882	4333
2010/11	3325	2957	3162	3235	3209	3010	3307	3813	4280	4376	4270	3945	4407
2011/12	3396	3021	3235	3315	3284	3078	3378	3893	4370	4466	4360	4030	4499
2012/13	3450	3072	3292	3380	3344	3131	3432	3955	4440	4536	4429	4096	4570
2013/14	3499	3117	3345	3439	3398	3179	3480	4010	4503	4598	4492	4155	4633
2014/15	3575	3188	3424	3525	3480	3253	3557	4098	4602	4697	4590	4247	4733
2015/16	3618	3228	3471	3579	3529	3296	3599	4146	4657	4751	4644	4299	4789
2016/17	3661	3269	3518	3633	3578	3339	3642	4195	4712	4806	4699	4352	4845
2017/18	3698	3304	3560	3681	3621	3377	3679	4237	4760	4853	4747	4398	4893
2018/19	3735	3337	3596	3718	3658	3411	3716	4280	4808	4902	4795	4442	4942
2019/20	3784	3381	3643	3767	3706	3455	3765	4336	4871	4966	4857	4500	5007
2020/21	3833	3425	3690	3816	3754	3500	3814	4392	4934	5030	4920	4559	5071
2021/22	3882	3469	3737	3865	3802	3545	3862	4448	4997	5094	4983	4617	5136
2022/23	3932	3513	3785	3914	3850	3590	3912	4505	5061	5159	5047	4676	5202
2023/24	3981	3557	3833	3963	3899	3635	3961	4562	5125	5225	5110	4735	5268
2024/25	4031	3602	3881	4013	3948	3681	4011	4619	5189	5290	5175	4794	5334
2025/26	4082	3647	3930	4064	3998	3727	4061	4677	5255	5357	5240	4855	5401
2026/27	4133	3693	3979	4115	4048	3774	4112	4736	5320	5424	5306	4916	5469
2027/28	4185	3739	4029	4166	4098	3821	4164	4795	5387	5492	5372	4977	5537
2028/29	4237	3786	4079	4218	4149	3869	4216	4854	5454	5560	5439	5039	5606
2029/30	4290	3832	4129	4270	4201	3917	4268	4915	5521	5629	5506	5101	5675
- See the Glossary of Terms for a definition of Net Total Peak													

Table 16

HISTORICAL NET FIRM ENERGY, NET TOTAL PEAK AND LOAD FACTOR							
Fiscal Year	Net Firm Energy (GW.h)			Net Total Peak (MW)			W.A. Load Factor
	Actual	Weather Adjust	W.A. Actual	Actual	Weather Adjust	W.A. Actual	
1974/75	10872	0	10872	1991	0	1991	62.3%
1975/76	11432	0	11432	2202	0	2202	59.3%
1976/77	11768	0	11768	2350	0	2350	57.2%
1977/78	11962	-110	11852	2446	0	2446	55.3%
1978/79	12483	-445	12038	2405	0	2405	57.1%
1979/80	12797	-271	12526	2465	0	2465	58.0%
1980/81	12529	203	12732	2536	0	2536	57.3%
1981/82	13527	-95	13432	2713	0	2713	56.5%
1982/83	13260	189	13449	2494	134	2628	58.4%
1983/84	14387	-200	14187	2875	28	2903	55.8%
1984/85	15014	-131	14882	2974	8	2982	57.0%
1985/86	15366	-157	15209	2945	116	3061	56.7%
1986/87	15495	316	15811	3003	117	3120	57.8%
1987/88	16260	291	16551	3326	-16	3310	57.1%
1988/89	17108	-348	16760	3403	-16	3387	56.5%
1989/90	17298	-162	17136	3611	-218	3393	57.7%
1990/91	17553	-126	17427	3542	-30	3512	56.6%
1991/92	17748	120	17868	3435	78	3513	58.1%
1992/93	17894	-148	17746	3404	50	3454	58.7%
1993/94	18048	-229	17820	3567	-51	3516	57.9%
1994/95	17784	232	18016	3342	85	3427	60.0%
1995/96	19000	-863	18138	3649	-81	3568	58.0%
1996/97	19173	-687	18486	3408	145	3553	59.4%
1997/98	18872	253	19125	3573	101	3674	59.4%
1998/99	19095	390	19486	3572	58	3630	61.3%
1999/00	18804	597	19401	3588	94	3682	60.2%
2000/01	20075	-186	19888	3706	49	3755	60.5%
2001/02	20494	167	20661	3759	40	3799	62.1%
2002/03	21940	-438	21502	3915	124	4039	60.8%
2003/04	21890	-105	21785	3958	2	3960	62.8%
2004/05	22426	-31	22395	4169	-40	4129	61.9%
2005/06	22598	446	23044	4054	64	4118	63.9%
2006/07	23305	-52	23253	4183	41	4224	62.8%
2007/08	23961	-249	23712	4273	39	4312	62.8%
2008/09	24262	-268	23994	4477	-153	4324	63.3%
- See the Glossary of Terms for a definition of Net Firm Energy and Net Total Peak							

SCENARIOS

This section includes specific scenarios that represent possible events that may cause a significant change to the load forecast. These are listed as individual cases so that they can be analyzed individually when the need arises.

Three scenarios are presented:

1. Electric Vehicle Technology Advances
2. Confidence of Low Rates by Industrial Customers
3. Cost of Heating Electrically Less than Gas

Electric Vehicle Technology Advances

This forecast already assumes there will be a noticeable impact due to electric vehicles starting to work their way into the automobile market in Manitoba over the next twenty years.

It is likely that the U.S. Government will significantly fund and encourage the technology and 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. In this scenario, electric vehicles are assumed to have 70% of the market share in 40 years.

The Emerging Energy Systems section at Manitoba Hydro has done detailed studies of electric car potential. Shown here is the difference from their High Scenario to the base case (already included in the forecast) and it shows the possible magnitude of load that might be added.

Shown below are the additional load implications if this scenario should occur:

Additional Load	10 years	20 years	30 years	40 years
Energy	50 GW.h	600 GW.h	1100 GW.h	1200 GW.h
System Peak	2 MW	30 MW	55 MW	60 MW

Note that the system peak contribution is very low. The number of vehicles plugged in at 8 a.m. and 5 p.m. in the winter months is lower than other hours since those are the usual commute times for the majority of vehicles.

Confidence of Low Rates by Industrial Customers

In recent years, the prices offered to our large industrial customers have been among the lowest in North America. This has attracted energy intensive companies to Manitoba, especially where electricity is a large part of their operating costs.

The risk of increasing our load faster than we can manage has led to Manitoba Hydro proposing its Energy Intensive Industrial Rate and submitting the application to the Public Utilities Board. The application is currently under review and may or may not be approved. The proposal of such a rate has shown Manitoba Hydro's intention to increase marginal industrial rates, and has changed the confidence level of future rates. As long as Manitoba Hydro is taking measures to match industrial rates to market prices, large energy intensive customers may be more cautious with their expansion plans. The Base Load Forecast assumes that Manitoba Hydro will continue to take measures to keep industrial rates fairly close to market prices.

If these measures stop, and large industrial customers regain their confidence that Manitoba Hydro would be offering them lower than market rates for the long term, it is likely that they will expand and that new customers will arrive. This scenario could result in the equivalent of a major chemical company every ten years.

Shown below are the additional load implications if this scenario should occur:

Additional Load	10 years	20 years	30 years	40 years
Energy	1500 GW.h	3000 GW.h	4500 GW.h	6000 GW.h
System Peak	200 MW	400 MW	600 MW	800 MW

Most Top Consumers have a very high load factor, and their system peak contribution will be somewhat less significant than their energy, as shown.

Cost of Heating Electrically Less than Gas

Natural gas used to have a significant price advantage over electricity for heating only ten years ago. But recent major increases in the price of natural gas have left the difference to be only about 15% in favor of a high-efficiency furnace over an electric furnace.

Manitoba Hydro's Energy Price Outlook forecasts this difference to slowly increase over the forecast period. As long as that happens, there will be no major shift from gas heat to electric heat and the forecast in this document remains valid.

However, there is a possibility that natural gas prices will rise above the cost of electricity prices. Should this happen, along with a perception that this will continue for the long term, it is reasonable to assume that the majority of gas heated homes will replace their gas furnaces with electric furnaces over time.

Shown below are the additional load implications if this scenario should occur:

Additional Load	10 years	20 years	30 years	40 years
Energy	3000 GW.h	6000 GW.h	8000 GW.h	9000 GW.h
System Peak	1000 MW	2000 MW	2667 MW	3000 MW

Electric heat has a very low load factor, and will peak on the coldest day when the Manitoba system peak occurs. Thus the peak contribution will be extreme.

LOAD FORECAST VARIABILITY

This section gives estimates of the range of variability that can be expected for the base forecast. Different ranges are computed for different levels of probability. These can then be used in risk analysis studies.

The variation in the forecast is divided into two parts:

1) Weather Variation - is the variation caused by above or below normal temperatures. A coefficient model is used to determine the weather effects. The standard deviation of historical changes due to weather is assumed to increase proportionally with the load.

2) Economic Variation - is the variation due to changes in economic conditions and other random changes in electricity load. The standard deviation and autocorrelation of historical changes in weather adjusted load are calculated. These are then used to estimate the future variability due to future economic and random events.

These two measures of variability are combined with the forecasts for Net Firm Energy and Net Total Peak to calculate the load variability.

In the following tables, variability is shown for six probability points: 2.5%, 5%, 10%, 90%, 95% and 97.5%. These represent the probability that the actual load will be less than the load shown.

Any probability point can be easily calculated as follows:

$$\text{Load} = \text{Base Fcst} + Z(\text{probability}) \times \text{Total Std Deviation}$$

Where $Z(\text{probability})$ = the number of standard deviations for that probability on a normal distribution. Here are some example points:

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

Additional points can be found from a standard Normal distribution table, or by using the Excel NORMINV function with a mean of 0 and standard deviation of 1.

Figure 18

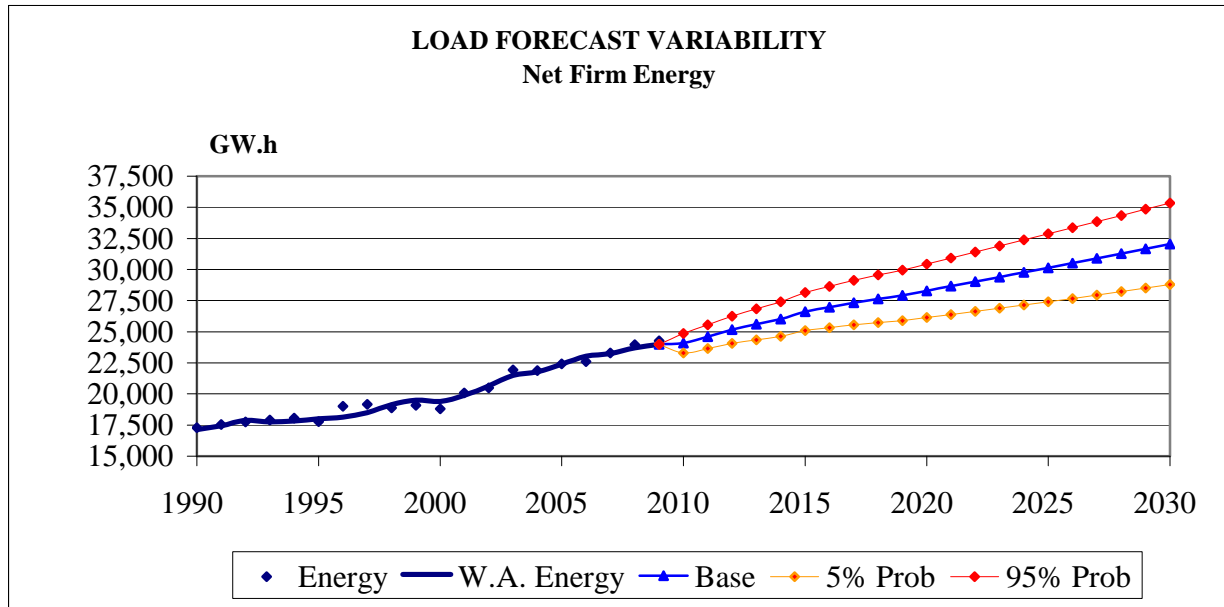


Table 17

Fiscal Year	Net Firm Energy Base Fcst	Wthr and Misc Std Dev	Econ and Model Std Dev	Total Std Dev	2.5% Prob Point	5.0% Prob Point	10.0% Prob Point	90.0% Prob Point	95.0% Prob Point	97.5% Prob Point
2009/10	24080	403	263	481	23138	23289	23464	24697	24872	25023
2010/11	24600	411	405	577	23469	23651	23860	25340	25550	25732
2011/12	25159	421	522	671	23844	24056	24299	26018	26262	26473
2012/13	25599	428	627	759	24111	24350	24626	26572	26847	27087
2013/14	26012	435	723	844	24358	24624	24930	27094	27401	27667
2014/15	26618	445	814	928	24799	25092	25429	27808	28145	28437
2015/16	26973	451	901	1008	24998	25316	25682	28264	28630	28948
2016/17	27331	457	984	1085	25204	25546	25940	28722	29116	29458
2017/18	27644	462	1065	1161	25368	25734	26156	29132	29554	29920
2018/19	27923	467	1143	1235	25502	25892	26340	29506	29955	30344
2019/20	28288	473	1220	1308	25723	26135	26611	29964	30440	30852
2020/21	28654	479	1295	1381	25948	26383	26884	30423	30925	31360
2021/22	29021	485	1368	1452	26175	26633	27160	30881	31409	31866
2022/23	29391	491	1440	1522	26408	26887	27440	31342	31894	32374
2023/24	29762	498	1512	1591	26643	27145	27723	31802	32380	32882
2024/25	30136	504	1582	1660	26882	27405	28009	32263	32866	33389
2025/26	30516	510	1651	1728	27130	27674	28302	32731	33358	33903
2026/27	30899	517	1719	1795	27380	27946	28598	33199	33851	34417
2027/28	31285	523	1787	1862	27636	28223	28899	33671	34348	34934
2028/29	31674	530	1854	1928	27895	28503	29203	34144	34845	35452
2029/30	32066	536	1920	1993	28158	28787	29511	34620	35345	35973

Figure 19

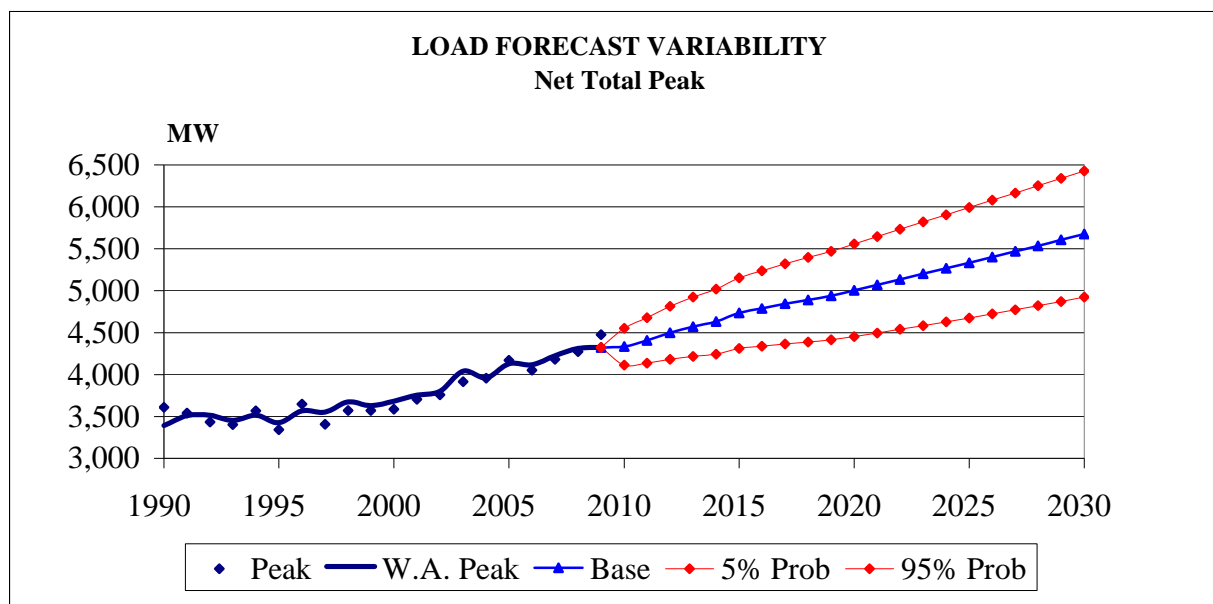


Table 18

Fiscal Year	Net Total Peak Base Fcst	Wthr and Misc Std Dev	Econ and Model Std Dev	Total Std Dev	2.5% Prob Point	5.0% Prob Point	10.0% Prob Point	90.0% Prob Point	95.0% Prob Point	97.5% Prob Point
2009/10	4333	92	96	133	4071	4113	4162	4503	4552	4594
2010/11	4407	94	136	165	4083	4135	4195	4618	4678	4730
2011/12	4499	96	166	192	4122	4183	4253	4745	4815	4875
2012/13	4570	97	192	215	4148	4215	4294	4846	4924	4992
2013/14	4633	99	215	236	4170	4244	4330	4936	5022	5097
2014/15	4733	101	235	256	4232	4312	4405	5062	5155	5235
2015/16	4789	102	254	274	4252	4338	4438	5140	5239	5326
2016/17	4845	103	272	291	4275	4367	4472	5217	5323	5415
2017/18	4893	104	288	307	4292	4389	4500	5286	5397	5494
2018/19	4942	105	304	322	4312	4413	4530	5354	5471	5572
2019/20	5007	107	319	336	4348	4454	4576	5437	5559	5665
2020/21	5071	108	333	350	4386	4496	4623	5520	5647	5757
2021/22	5136	110	346	363	4424	4539	4671	5602	5734	5849
2022/23	5202	111	359	376	4465	4583	4720	5684	5821	5939
2023/24	5268	112	372	389	4506	4628	4770	5766	5907	6030
2024/25	5334	114	384	401	4548	4675	4820	5847	5993	6119
2025/26	5401	115	396	413	4593	4723	4872	5930	6080	6210
2026/27	5469	117	408	424	4638	4771	4925	6012	6166	6300
2027/28	5537	118	419	435	4684	4822	4980	6095	6253	6390
2028/29	5606	120	430	446	4732	4872	5034	6178	6340	6480
2029/30	5675	121	440	457	4780	4924	5090	6261	6426	6570

FORECAST ACCURACY

Comparing previous load forecast to actual results has been complicated by changes in utility operations and reporting. Five major changes have occurred since 1990. Each of these changes will be discussed briefly.

1) Interruptible (Non-Firm) Sales - Since 1991/92, Manitoba Hydro has offered interruptible rates to its customers. These rates have created a distinction between firm and non-firm sales, which affect the calculation of Net Firm Energy because non-firm sales are excluded.

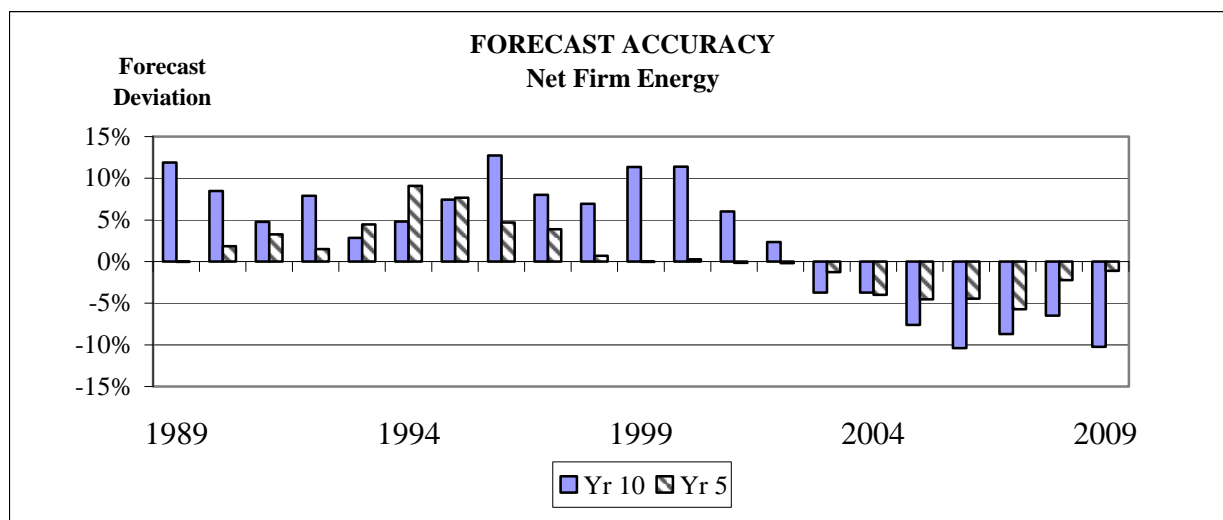
2) Demand Side Management - Since 1992/93, Manitoba Hydro has included Demand Side Management (DSM) as a supply side resource in the determination of System Capability and Energy Requirement. The load forecast contains DSM associated with the Basic Customer Information and Service option. The forecast includes savings from appliance efficiency improvements and other base DSM programs. It does not include incentive-based DSM programs. These are reviewed as a supply-side resource that can be ramped up or down dependant on future need.

3) Curtailable Rates - Since 1993/94, Manitoba Hydro has offered a curtailable rate program to its customers. These rates affect the actual peak load experienced because customers are usually curtailed at the time of peak. When calculating the Net Total Peak for this report, the curtailments are added back to create a consistent hourly integrated load profile.

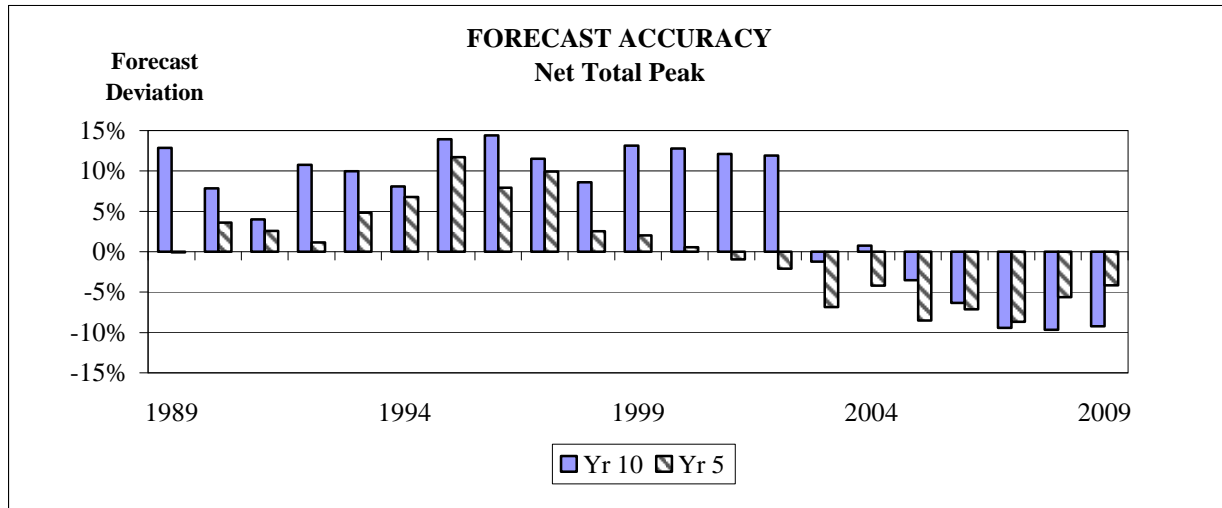
4) Station Service - Since 1993/94, transmission losses and station service have been metered separately at the generation stations. Previously, transmission losses and station service were indistinguishable and recorded under transmission losses. The separation of transmission losses and station service affect the calculation of Net Firm Energy because station service losses are excluded.

5) Peak Definition - Since 1993/94, Manitoba Hydro has defined the system peak as an hourly integrated value. Previously, the peak was recorded as an instantaneous or one minute peak.

Depending on when the forecast was created, adjustments have been made to the forecasted energy and peak values to account for these variances. This will present a more meaningful analysis of the long-term forecast accuracy.

Figure 20**Table 19**

Fiscal Year	Forecast Prepared 10 Years Previous	Forecast Prepared 5 Years Previous	Actual Net Firm Energy	Weather Adjustment	W.A. Net Firm Energy	10 Year Percent Deviation	5 Year Percent Deviation
1988/89	18751	16753	17108	-348	16760	11.9%	0.0%
1989/90	18585	17451	17298	-162	17136	8.5%	1.8%
1990/91	18254	17994	17553	-126	17427	4.7%	3.3%
1991/92	19280	18135	17748	120	17868	7.9%	1.5%
1992/93	18253	18533	17894	-148	17746	2.9%	4.4%
1993/94	18674	19440	18048	-229	17820	4.8%	9.1%
1994/95	19357	19400	17784	232	18016	7.4%	7.7%
1995/96	20450	18985	19000	-863	18138	12.8%	4.7%
1996/97	19970	19199	19173	-687	18486	8.0%	3.9%
1997/98	20452	19258	18872	253	19125	6.9%	0.7%
1998/99	21696	19476	19095	390	19486	11.3%	-0.1%
1999/00	21611	19453	18804	597	19401	11.4%	0.3%
2000/01	21083	19858	20075	-186	19888	6.0%	-0.2%
2001/02	21146	20622	20494	167	20661	2.3%	-0.2%
2002/03	20702	21231	21940	-438	21502	-3.7%	-1.3%
2003/04	20975	20919	21890	-105	21785	-3.7%	-4.0%
2004/05	20694	21384	22426	-31	22395	-7.6%	-4.5%
2005/06	20644	22015	22598	446	23044	-10.4%	-4.5%
2006/07	21229	21920	23305	-52	23253	-8.7%	-5.7%
2007/08	22171	23186	23961	-249	23712	-6.5%	-2.2%
2008/09	21533	23728	24262	-268	23994	-10.3%	-1.1%

Figure 21**Table 20**

Fiscal Year	Forecast Prepared 10 Years Previous	Forecast Prepared 5 Years Previous	Actual Net Total Peak	Weather Adjustment	W.A. Net Total Peak	10 Year Percent Deviation	5 Year Percent Deviation
1988/89	3822	3384	3403	-16	3387	12.9%	-0.1%
1989/90	3659	3515	3611	-218	3393	7.8%	3.6%
1990/91	3652	3603	3542	-30	3512	4.0%	2.6%
1991/92	3892	3553	3435	78	3513	10.8%	1.1%
1992/93	3799	3621	3404	50	3454	10.0%	4.8%
1993/94	3799	3754	3567	-51	3516	8.1%	6.8%
1994/95	3904	3829	3342	85	3427	13.9%	11.7%
1995/96	4081	3850	3649	-81	3568	14.4%	7.9%
1996/97	3962	3906	3408	145	3553	11.5%	9.9%
1997/98	3990	3768	3573	101	3674	8.6%	2.5%
1998/99	4108	3703	3572	58	3630	13.2%	2.0%
1999/00	4152	3703	3588	94	3682	12.8%	0.6%
2000/01	4210	3719	3706	49	3755	12.1%	-1.0%
2001/02	4251	3719	3759	40	3799	11.9%	-2.1%
2002/03	3989	3762	3915	124	4039	-1.2%	-6.9%
2003/04	3990	3794	3958	2	3960	0.7%	-4.2%
2004/05	3984	3778	4169	-40	4129	-3.5%	-8.5%
2005/06	3858	3825	4054	64	4118	-6.3%	-7.1%
2006/07	3826	3858	4183	41	4224	-9.4%	-8.7%
2007/08	3896	4070	4273	39	4312	-9.7%	-5.6%
2008/09	3926	4144	4477	-153	4324	-9.2%	-4.2%

CALENDAR YEAR RESULTS

Table 21

ENERGY SALES TO MANITOBA HYDRO CUSTOMERS (GW.h)							
Base Forecast							
2008 - 2029							
Calendar Year	Residential	General Service	Area & Roadway Lighting	Manitoba Hydro Sales Incl Diesel		Total Diesel	Manitoba Hydro Sales Excl Diesel
2008 Actual	6861	14241	101	21203	-0.1%	12	21191
2009	6977	14085	102	21164	-0.2%	13	21151
2010	6915	14319	103	21338	0.8%	14	21324
2011	6998	14719	104	21821	2.3%	14	21807
2012	7085	15052	105	22242	1.9%	14	22228
2013	7174	15329	106	22608	1.6%	14	22594
2014	7264	15729	107	23099	2.2%	15	23085
2015	7355	16006	107	23468	1.6%	15	23453
2016	7447	16226	108	23781	1.3%	15	23766
2017	7540	16416	109	24065	1.2%	15	24049
2018	7633	16573	110	24317	1.0%	16	24301
2019	7728	16778	111	24617	1.2%	16	24601
2020	7824	17002	111	24937	1.3%	16	24921
2021	7920	17226	112	25258	1.3%	16	25242
2022	8018	17450	113	25581	1.3%	17	25565
2023	8118	17674	114	25906	1.3%	17	25889
2024	8219	17900	115	26233	1.3%	17	26215
2025	8320	18128	115	26564	1.3%	18	26546
2026	8422	18360	116	26898	1.3%	18	26880
2027	8526	18593	117	27235	1.3%	18	27217
2028	8630	18827	118	27575	1.2%	18	27557
2029	8735	19064	118	27917	1.2%	19	27899

Table 22

NET FIRM ENERGY (GW.h) Base Forecast 2008 - 2029								
Calendar Year	Dist. Losses	Const. Power	Manitoba Load @ Common Bus	Trans. Losses	Net Firm Energy	Non Firm Energy	Station Service	Gross Total Energy
2008 Actual	1096	53	22340	1965	24283	22	160	24465
2009	975	69	22195	1999	24171	23	153	24347
2010	1046	84	22454	2009	24444	18	159	24621
2011	1071	79	22957	2054	24995	15	162	25173
2012	1098	67	23393	2092	25470	15	164	25649
2013	1115	60	23769	2126	25889	6	164	26059
2014	1132	52	24269	2171	26440	0	164	26604
2015	1161	48	24662	2206	26868	0	164	27032
2016	1176	48	24990	2235	27225	0	164	27389
2017	1192	48	25290	2262	27551	0	164	27716
2018	1207	48	25555	2285	27841	0	164	28005
2019	1218	48	25867	2313	28180	0	164	28344
2020	1233	48	26202	2343	28545	0	164	28710
2021	1249	48	26539	2373	28912	0	164	29076
2022	1265	48	26878	2404	29281	0	164	29446
2023	1281	48	27218	2434	29653	0	164	29817
2024	1297	48	27561	2465	30025	0	164	30190
2025	1314	48	27908	2496	30404	0	164	30568
2026	1330	48	28258	2527	30785	0	164	30950
2027	1347	48	28612	2559	31171	0	164	31335
2028	1363	48	28968	2591	31559	0	164	31723
2029	1380	48	29327	2623	31950	0	164	32114
- See the Glossary of Terms for a definition of Gross Total Energy, Non Firm Energy, Station Service and Net Firm Energy								

GLOSSARY OF TERMS

The two key differences in terminology used throughout this report are:

- 1) **GROSS vs NET** - for both energy and peak, gross figures include station service loads; whereas net figures exclude station service loads.
- 2) **TOTAL vs FIRM** - total energy includes non-firm energy and firm energy excludes non-firm energy. Total peak adds back curtailed loads and firm peak excludes curtailed loads.

Gross Firm Energy - includes all energy needed to meet the requirements of Manitoba customers on the integrated system. This figure includes station service but excludes non-firm energy. This figure does not include diesel generation, Industrial self-generation, exports, imports, exports losses or import gains.

Gross Total Peak - is the maximum hourly demand in a given year, required to meet the needs of Manitoba customers on the integrated system. This figure includes station service loads and also includes (adds back in) curtailable loads. This figure does not include diesel generation, Industrial self-generation, exports, imports, export losses or import gains.

Net Firm Energy and **Net Total Peak** - are the same as Gross Firm Energy/Peak except they omit station service.

Station Service - is electricity consumed by generating stations to produce electric power.

Interruptible (Non-Firm) Energy - includes all energy sold to Manitoba customers on a non-firm basis. This category includes all sales from the Surplus Energy Program (SEP).

Curtailable - is 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.