

MANITOBA HYDRO
2012/13 & 2013/14 GENERAL RATE APPLICATION

VOLUME II

ELECTRIC LOAD FORECAST AND LOAD RESEARCH

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8.0 OVERVIEW OF TAB 8

Tab 8 discusses the Electric Load Forecast and Load Research results. Section 8.1 provides a summary of the 2011 Electric Load Forecast, and Section 8.2 provides a summary of the Electric Load Research results for the fiscal year ending March 31, 2011.

8.1 ELECTRIC LOAD FORECAST SUMMARY

The Electric Load Forecast provides a projection of future electricity demand in Manitoba with a forecast provided for both energy and capacity requirements. A copy of the 2011 Electric Load Forecast is provided in Appendix 8.1.

Residential Sector

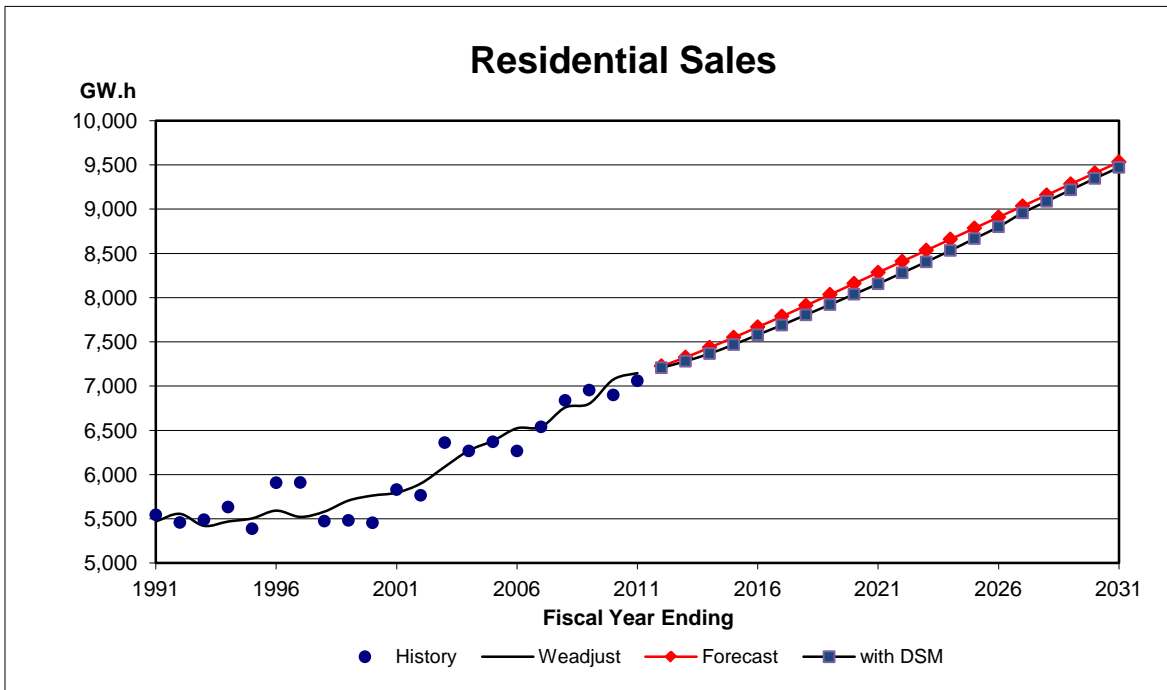
Historical Period (1991/92 - 2010/11):

The residential sector had minimal growth during the 1990's but growth has been steady since about 1999. During the last 20 years, weather adjusted Residential consumption has been growing at an average of 84 GW.h or 1.3% per year.

Forecast Period (2011/12 – 2030/31):

Over the forecast period, the Residential sector is expected to grow by 119 GW.h or 1.5% per year. This is primarily due to anticipated growth of approximately 5,000 residential customers per year. With the inclusion of energy savings to be achieved through Power Smart programs, the overall net Residential growth is expected to be 116 GW.h or 1.4% per year. Figure 8.1.1 below provides a graphical representation.

1 **Figure 8.1.1- Residential Sales**



2
3 Note: Sales forecast at meter.

4
5 **General Service Sector**

6
7 Historical Period (1991/92 - 2010/11):

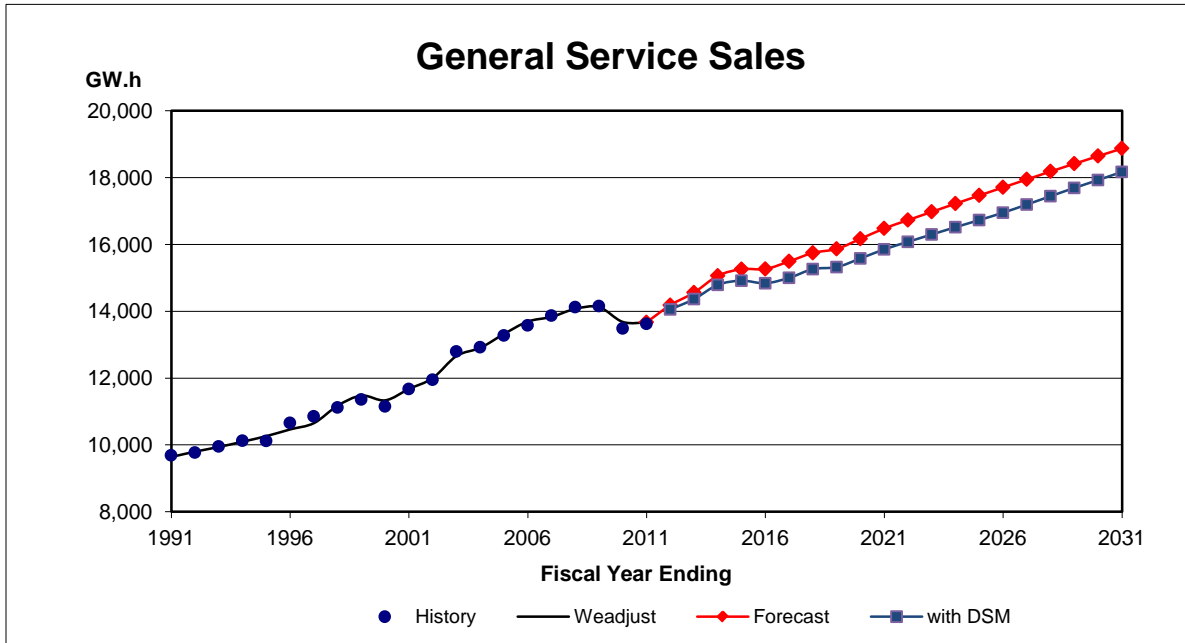
8
9 During the past 20 years, the General Service sector has grown 203 GW.h or 1.8% per
10 year on a weather-adjusted basis. This sector primarily consists of two categories of
11 consumers: Mass Market and Top Consumers. Mass Market has grown steadily at an
12 average of 117 GW.h per year. The Top Consumers are more sensitive to economic
13 conditions and were growing at an average of 142 GW.h per year until the onset of the
14 economic downturn of 2009/10. During 2009/10 and 2010/11, the Top Customers
15 decreased 741 GW.h.

16
17 Forecast Period (2011/12 – 2030/31):

18
19 With the economy recovering, growth in the General Service sector is expected to return
20 to normal in 2011/12. It is forecast to grow 260 GW.h or 1.6% per year over the forecast
21 period. Mass Market is expected to make up 150 GW.h per year of projected growth with
22 Top Consumers making up the remaining 110 GW.h per year. This includes the
23 anticipated loss of a major load in 2016 from the Top Consumers category. The inclusion

1 of DSM programs lowers General Service growth to 225 GW.h or 1.4% per year. Figure
2 8.1.2 below provides a graphical representation. Figure 8.1.2 below provides a graphical
3 representation.
4

5 **Figure 8.1.2- General Service Sales**



6
7 Note: Sales forecast at meter.

8
9 **Net Firm Energy**

10
11 Net Firm Energy includes all electricity that is generated to meet firm energy
12 requirements for all customers within Manitoba and excludes non-firm (interruptible
13 load) and station service loads.

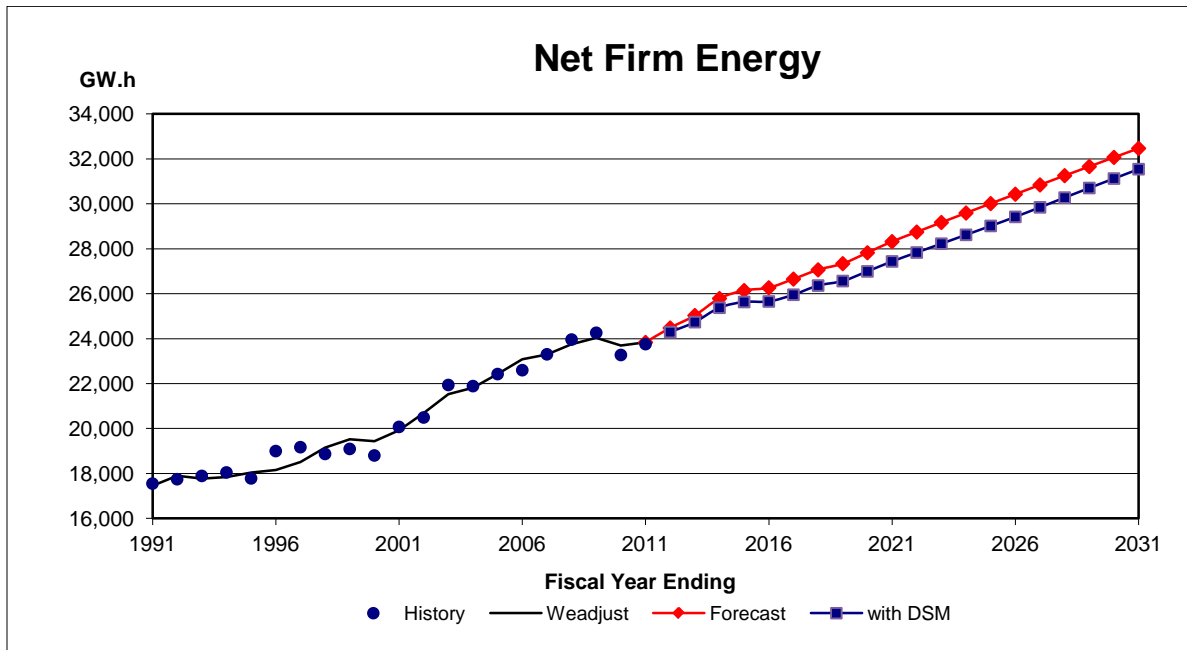
14
15 Historical Period (1991/92 - 2010/11):

16
17 During the past 20 years, Net Firm Energy has grown 312 GW.h or 1.5% per year on a
18 weather-adjusted basis. The trend in Net Firm Energy growth has been relatively
19 consistent over the period. The economic downturn had a significant impact on some
20 General Service Top Consumers in 2009/10 and was the main reason for the decline that
21 year.
22

1 Forecast Period (2011/12 – 2030/31):

2
3 During the forecast period, Net Firm Energy is expected to grow 432 GW.h or 1.6% per
4 year. The inclusion of DSM programs will lower Net Firm Energy growth to 385 GW.h
5 or 1.4% per year. Figure 8.1.3 below provides a graphical representation.
6

7 **Figure 8.1.3- Net Firm Energy**



8 Note: Energy forecast at generation.
9

10 **Net Total Peak**

11 The Net Total Peak is the maximum hourly load required to serve Manitoba Hydro's
12 customers on the Integrated System. It excludes exports, diesel customers and station
13 service, with curtailed loads added back in. The term "integrated" indicates that the
14 average load within the peak hour is used.
15
16

17 Historical Period (1991/92 - 2010/11):

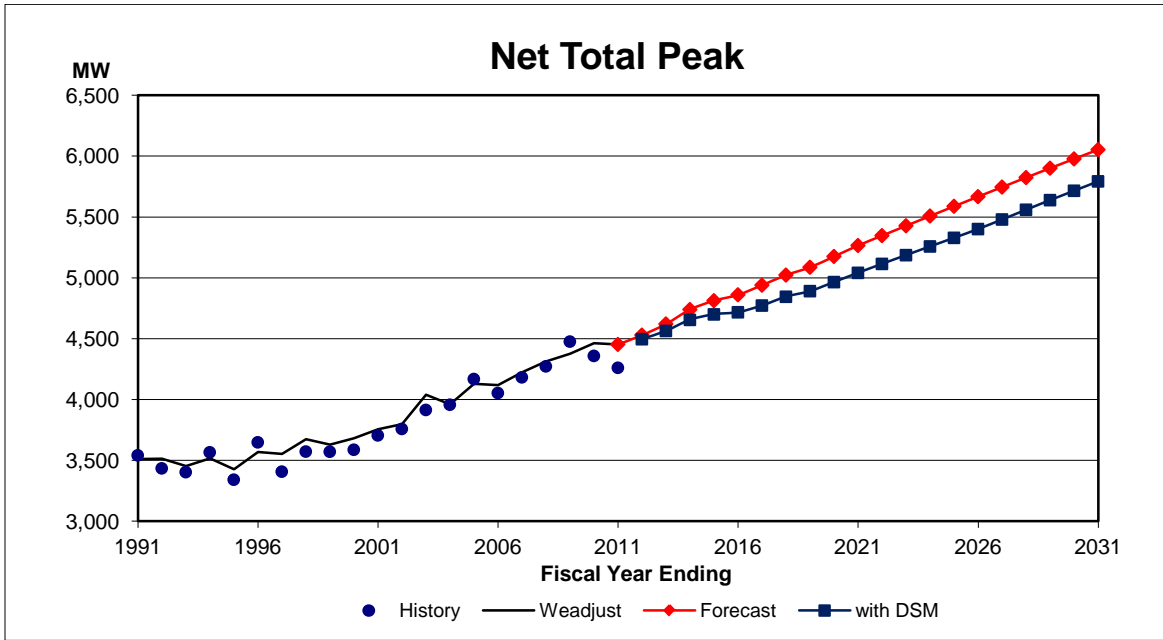
18 During the past 20 years, Net Total Peak has grown 49 MW or 1.3% per year on a
19 weather-adjusted basis. Net Total Peak has grown significantly since 2000/01, reflecting
20 the general growth in energy load over that period.
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Forecast Period (2011/12 – 2030/31):

During the forecast period, Net Total Peak is projected to grow 80 MW or 1.5% per year. The inclusion of DSM programs will lower the demand growth to 67 MW or 1.3% per year. Figure 8.1.4 below provides a graphical representation.

Figure 8.1.4- Net Total Peak



8
9
10

Note: Peak forecast at generation.

1 **8.2 ELECTRIC LOAD RESEARCH RESULTS**

2
3 This Section presents a summary of results by customer class from the Corporation's load
4 research program. These results are used to develop the customer class energy and peak
5 responsibility tables in the Corporation's Cost of Service Study. The load research
6 results pertain to the fiscal year ending March 31, 2011. The load research results are an
7 integral part of the Cost of Service Study which applies forecast energies to the results to
8 develop energy and demand allocators.
9

10 The Load Research tables provided in this section are as follows:

11
12 8.2.1 2010/11 load research summary which shows: number of customers, billed
13 energy, average energy, estimated coincident and non-coincident peaks by class
14 and relative accuracy of peak load estimates.

15
16 8.2.2 Highest 50 total peak hours – Winter 2010/11

17
18 8.2.3 Highest 50 total peak hours – Summer 2010/11
19
20

1 Schedule 8.2.1 (1) – Load Research Summary by Customer Class
2
3

Load Research Results Average 2010/2011 Corresponding to Highest 50 Summer Generation Peaks										
	Average Metered Customer Count	Total Energy (kWh)	Average Energy (kWh)	Coincident Peak Load Jun-Aug 06:00 to 22:00 (kW)	Avg Coincident Peak Load (kW)	Coincident Peak Load Factor	Relative Accuracy %	Non Coincident Peak Load May-Oct 00:00 to 24:00 (kW)	Non Coincident Peak time	Non Coincident Peak Load Factor
Residential	448,867	6,737,250,345	15,009	584,633	1.30	131.6%	7.80	1,023,615	10/10/28 20:00	75.1%
GS Small Non Demand	52,385	1,576,123,536	30,087	190,256	3.63	94.6%	10.48	249,964	10/08/10 13:00	72.0%
GS Small Demand	7,056	1,930,293,411	273,568	218,419	30.96	100.9%	4.94	276,393	10/10/29 11:00	79.7%
GS Medium	1,887	3,060,995,602	1,622,149	380,226	201.50	91.9%	5.66	472,092	10/08/10 14:00	74.0%
GS Medium SEP	16	22,299,604	1,393,725	441	27.57	577.0%	0.00	3,704	10/10/29 10:00	68.7%
GS Medium Total	1,903	3,083,295,206	1,620,229	380,667	200.04	92.5%				
GS Large 750-30 kV	269	1,599,193,401	5,944,957	204,939	761.85	89.1%	0.10	247,274	10/08/23 12:00	73.8%
GS Large 750-30 kV SEP	3	2,086,967	695,656	516	171.93	46.2%	0.00	1,576	10/08/31 11:00	15.1%
GS Large 750-30 kV Total	272	1,601,280,368	5,887,060	205,455	755.35	89.0%				
GS Large 30-100 kV	35	778,414,269	22,240,408	89,094	2,545.53	99.7%	5.22	121,802	10/05/06 21:00	73.0%
GS Large 30-100 kV Curtailable	1	225,799,769	225,799,769	25,842	25,841.60	99.7%	0.00	27,109	10/09/29 01:00	95.1%
GS Large 30-100 kV Total	36	1,004,214,038	27,894,834	114,935	3,192.64	99.7%				
GS Large > 100 kV	12	2,549,483,703	212,456,975	249,375	20,781.29	116.7%	11.44	347,906	10/10/26 02:00	83.7%
GS Large > 100 kV Curtailable	3	1,864,427,156	621,475,719	202,995	67,664.95	104.8%	0.00	225,619	10/05/06 15:00	94.3%
GS Large > 100 kV Total	15	4,413,910,859	294,260,724	452,370	30,158.02	111.4%				
Common Bus				2,359,016		105.5%		2,842,376	10/08/09 18:00	87.6%
Exports				1,903,720		66.2%		2,330,000	10/08/25 06:00	54.1%
Generation				4,600,300		85.1%		4,705,000	10/08/29 18:00	83.2%
Imports				92,100		167.3%		815,000	10/05/23 04:00	18.9%
Wind Generation				18,595		249.2%		102,727	10/05/30 11:00	45.1%

1 Schedule 8.2.1 (2) - Load Research Summary by Customer Class
2
3

Load Research Results Average 2010/2011 Corresponding to Highest 50 Winter Generation Peaks										
	Average Metered Customer Count	Total Energy (kWh)	Average Energy (kWh)	Coincident Peak Load Dec-Feb 06:00 to 22:00 (kW)	Avg Coincident Peak Load (kW)	Coincident Peak Load Factor	Relative Accuracy %	Non Coincident Peak Load Nov-Apr 00:00 to 24:00 (kW)	Non Coincident Peak time	Non Coincident Peak Load Factor
Residential	448,867	6,737,250,345	15,009	1,332,141	2.97	57.7%	4.20	1,706,728	11/01/30 20:00	45.1%
GS Small Non Demand	52,385	1,576,123,536	30,087	262,268	5.01	68.6%	7.46	315,467	11/01/21 12:00	57.0%
GS Small Demand	7,056	1,930,293,411	273,568	305,731	43.33	72.1%	3.66	357,204	11/01/18 10:00	61.7%
GS Medium	1,887	3,060,995,602	1,622,149	445,474	236.08	78.4%	3.44	519,043	11/01/21 11:00	67.3%
GS Medium SEP	16	22,299,604	1,393,725	4,982	311.39	51.1%	0.00	6,210	11/01/22 10:00	41.0%
GS Medium Total	1,903	3,083,295,206	1,620,229	450,456	236.71	78.1%				
GS Large 750-30 kV	269	1,599,193,401	5,944,957	216,408	804.49	84.4%	0.19	253,023	11/01/20 11:00	72.2%
GS Large 750-30 kV SEP	3	2,086,967	695,656	301	100.35	79.1%	0.00	1,240	10/11/01 10:00	19.2%
GS Large 750-30kV Total	272	1,601,280,368	5,887,060	216,709	796.73	84.4%				
GS Large 30-100 kV	35	778,414,269	22,240,408	83,925	2,397.86	105.9%	4.54	142,918	11/02/19 02:00	62.2%
GS Large 30-100 kV Curtailable	1	225,799,769	225,799,769	26,711	26,711.28	96.5%	0.00	27,128	11/03/20 00:00	95.0%
GS Large 30-100 Total	36	1,004,214,038	27,894,834	110,636	3,073.23	103.6%				
GS Large > 100 kV	12	2,549,483,703	212,456,975	330,985	27,582.08	87.9%	6.34	386,921	11/03/07 02:00	75.2%
GS Large > 100 kV Curtailable	3	1,864,427,156	621,475,719	230,147	76,715.51	92.5%	0.00	258,281	10/12/11 20:00	82.4%
GS Large > 100kV Total	15	4,413,910,859	294,260,724	561,132	37,408.77	89.8%				
Common Bus		21,802,572,419		3,450,699		72.1%		3,944,857	11/01/20 19:00	63.1%
Exports		11,036,891,000		936,980		134.5%		2,026,000	10/11/08 06:00	62.2%
Generation		34,284,875,000		4,621,160		84.7%		4,664,000	11/01/11 18:00	83.9%
Imports		1,349,589,000		168,980		91.2%		507,000	11/01/01 05:00	30.4%
Wind Generation		405,967,986		24,601		188.4%		225,208	11/03/22 22:00	20.6%

1

Schedule 8.2.2 - Highest 50 Generation Peak Hours – Winter 2010/11

Top 50 Winter Hours (December, January and February; 06:00 to 22:00)								
Total Generation								
Sum of kWh	Revenue Class							
Date Time	Common Bus	Curtailable > 100 kV	Curtailable < 100 kV	Exports	Generation	Imports	Station	Service
10/12/01 17:00	3,279,562	0	0	1,051,000	4,626,000	151,000	299,800	
10/12/01 18:00	3,489,307	0	0	864,000	4,630,000	163,000	318,600	
10/12/01 19:00	3,485,190	0	0	829,000	4,611,000	136,000	309,800	
10/12/02 08:00	3,480,358	0	0	811,000	4,609,000	149,000	308,100	
10/12/02 18:00	3,534,153	0	0	818,000	4,612,000	179,000	329,600	
10/12/03 18:00	3,395,535	0	0	960,000	4,614,000	187,000	343,200	
10/12/04 15:00	2,982,873	0	0	1,306,000	4,603,000	106,000	329,400	
10/12/04 17:00	3,131,636	0	0	1,221,000	4,639,000	123,000	351,100	
10/12/04 18:00	3,256,207	0	0	1,074,000	4,633,000	129,000	359,800	
10/12/05 18:00	3,234,536	0	0	1,140,000	4,646,000	152,000	326,500	
10/12/05 19:00	3,188,276	0	0	1,111,000	4,613,000	124,000	333,200	
10/12/05 20:00	3,155,539	0	0	1,136,000	4,612,000	116,000	346,600	
10/12/05 21:00	3,123,749	0	0	1,173,000	4,629,000	107,000	359,200	
10/12/06 14:00	3,116,646	0	0	1,178,000	4,596,000	145,000	304,800	
10/12/06 15:00	3,114,927	0	0	1,201,000	4,611,000	149,000	314,700	
10/12/07 08:00	3,405,067	0	0	909,000	4,636,000	142,000	368,000	
10/12/07 20:00	3,458,722	0	0	844,000	4,607,000	120,000	329,200	
10/12/07 21:00	3,409,849	0	0	944,000	4,654,000	120,000	342,500	
10/12/07 22:00	3,334,768	0	0	1,022,000	4,627,000	156,000	366,000	
10/12/08 14:00	3,178,553	0	0	1,189,000	4,600,000	177,000	373,900	
10/12/09 08:00	3,336,857	0	0	1,073,000	4,598,000	218,000	417,700	
10/12/09 13:00	3,205,858	0	0	1,303,000	4,601,000	246,000	310,700	
10/12/10 08:00	3,536,858	0	0	780,000	4,626,000	115,000	271,600	
10/12/10 15:00	3,311,322	0	0	989,000	4,614,000	118,000	353,000	
10/12/10 16:00	3,406,922	0	0	958,000	4,607,000	160,000	368,000	
10/12/10 17:00	3,592,743	0	0	800,000	4,597,000	182,000	380,800	
10/12/11 10:00	3,541,781	0	0	824,000	4,597,000	147,000	337,400	
10/12/11 11:00	3,508,912	0	0	864,000	4,617,000	142,000	348,500	
10/12/11 12:00	3,481,538	0	0	883,000	4,617,000	144,000	357,500	
10/12/13 15:00	3,517,169	0	0	959,000	4,605,000	217,000	437,900	
10/12/13 21:00	3,655,590	0	0	867,000	4,636,000	185,000	344,000	
10/12/14 21:00	3,525,718	0	0	1,016,000	4,600,000	242,000	359,000	
10/12/28 17:00	3,047,850	0	0	1,422,000	4,620,000	197,000	340,900	
10/12/28 18:00	3,200,747	0	0	1,268,000	4,609,000	183,000	348,700	
11/01/02 10:00	3,351,829	0	0	969,000	4,598,000	139,000	280,300	
11/01/11 08:00	3,457,700	0	0	1,012,000	4,633,000	236,000	290,200	
11/01/11 18:00	3,550,890	0	0	898,000	4,664,000	176,000	318,600	
11/01/18 11:00	3,812,221	0	0	562,000	4,645,000	156,000	372,200	
11/01/18 12:00	3,775,683	0	0	570,000	4,626,000	144,000	373,700	
11/01/18 14:00	3,640,309	0	0	729,000	4,631,000	150,000	312,000	
11/01/18 15:00	3,634,832	0	0	761,000	4,648,000	154,000	323,900	
11/01/18 20:00	3,853,051	0	0	619,000	4,619,000	247,000	384,800	
11/01/20 15:00	3,507,307	0	0	855,000	4,609,000	144,000	392,900	
11/01/20 18:00	3,941,067	0	0	518,000	4,660,000	210,000	273,400	
11/01/21 10:00	3,897,602	0	0	683,000	4,603,000	324,000	445,700	
11/01/21 12:00	3,779,158	0	0	774,000	4,651,000	299,000	385,200	
11/01/21 13:00	3,720,968	0	0	834,000	4,664,000	285,000	320,700	
11/01/21 14:00	3,666,237	0	0	879,000	4,597,000	303,000	246,600	
11/02/25 19:00	3,649,359	0	0	734,000	4,658,000	86,000	335,500	
11/02/25 20:00	3,671,406	0	0	665,000	4,600,000	69,000	346,400	

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1 **Schedule 8.2.3 - Highest 50 Generation Peak Hours – Summer 2010/11**

Top 50 Summer Hours (June, July and August; 06:00 to 22:00)							
Total Generation							
Sum of kWh	Revenue Class						
Date Time	Common Bus	Curtailable > 100 kV	Curtailable < 100 kV	Exports	Generation	Imports	Station Service
10/08/29 18:00	2,235,304	0	0	2,051,000	4,705,000	44,000	266,900
10/08/29 19:00	2,235,938	0	0	2,035,000	4,693,000	49,000	279,800
10/08/29 17:00	2,164,379	0	0	2,099,000	4,670,000	47,000	350,300
10/07/09 15:00	2,537,602	0	0	1,804,000	4,653,000	143,000	240,700
10/08/17 11:00	2,143,536	0	0	2,170,000	4,640,000	104,000	263,600
10/08/29 15:00	2,109,878	0	0	2,121,000	4,639,000	44,000	339,600
10/07/08 19:00	2,373,829	0	0	1,942,000	4,635,000	98,000	296,800
10/07/08 18:00	2,411,202	0	0	1,904,000	4,626,000	97,000	286,200
10/07/08 17:00	2,407,199	0	0	1,914,000	4,625,000	99,000	282,100
10/08/29 16:00	2,116,199	0	0	2,097,000	4,625,000	39,000	341,600
10/07/12 11:00	2,320,760	0	0	1,954,000	4,623,000	126,000	235,800
10/08/29 20:00	2,206,341	0	0	1,992,000	4,619,000	30,000	288,800
10/07/09 19:00	2,507,654	0	0	1,777,000	4,616,000	126,000	300,300
10/07/08 16:00	2,367,394	0	0	1,934,000	4,615,000	102,000	258,400
10/08/17 10:00	2,088,602	0	0	2,196,000	4,614,000	107,000	252,500
10/08/03 17:00	2,603,845	0	0	1,650,000	4,614,000	94,000	291,400
10/07/12 13:00	2,400,167	0	0	1,844,000	4,609,000	115,000	249,000
10/08/25 22:00	2,210,697	0	0	2,011,000	4,605,000	48,000	230,500
10/07/08 20:00	2,308,039	0	0	1,974,000	4,602,000	101,000	216,300
10/08/29 21:00	2,223,911	0	0	1,983,000	4,601,000	34,000	290,000
10/07/15 21:00	2,320,285	0	0	2,032,000	4,601,000	125,000	203,800
10/08/26 19:00	2,464,496	0	0	1,815,000	4,600,000	40,000	200,400
10/07/14 12:00	2,442,532	0	0	1,868,000	4,599,000	98,000	178,800
10/08/12 12:00	2,492,527	0	0	1,725,000	4,594,000	70,000	179,800
10/07/19 12:00	2,402,265	0	0	1,863,000	4,592,000	90,000	245,200
10/08/27 17:00	2,669,251	0	0	1,637,000	4,589,000	121,000	270,100
10/08/03 15:00	2,570,046	0	0	1,669,000	4,586,000	99,000	273,300
10/07/14 13:00	2,450,186	0	0	1,869,000	4,584,000	106,000	189,200
10/08/27 18:00	2,660,633	0	0	1,651,000	4,584,000	136,000	282,300
10/07/09 16:00	2,540,104	0	0	1,739,000	4,582,000	137,000	250,600
10/07/08 22:00	2,214,381	0	0	2,038,000	4,582,000	84,000	236,000
10/07/13 17:00	2,395,929	0	0	1,850,000	4,582,000	93,000	221,100
10/07/12 12:00	2,371,178	0	0	1,862,000	4,581,000	118,000	252,700
10/07/13 15:00	2,355,503	0	0	1,898,000	4,581,000	92,000	211,700
10/08/04 10:00	2,167,944	0	0	2,044,000	4,580,000	74,000	337,300
10/08/03 16:00	2,590,963	0	0	1,648,000	4,580,000	102,000	295,200
10/07/12 10:00	2,248,252	0	0	1,975,000	4,580,000	110,000	233,800
10/08/02 13:00	2,269,292	0	0	1,916,000	4,578,000	90,000	234,300
10/08/27 16:00	2,651,316	0	0	1,652,000	4,577,000	128,000	267,800
10/08/22 19:00	2,513,492	0	0	1,779,000	4,575,000	81,000	214,700
10/07/08 21:00	2,268,062	0	0	1,990,000	4,573,000	100,000	225,700
10/08/03 12:00	2,448,266	0	0	1,777,000	4,572,000	109,000	245,200
10/08/27 15:00	2,644,998	0	0	1,655,000	4,571,000	111,000	255,100
10/08/05 14:00	2,252,970	0	0	1,970,000	4,570,000	92,000	277,800
10/08/29 22:00	2,222,894	0	0	1,968,000	4,569,000	32,000	300,000
10/08/07 18:00	2,347,865	0	0	1,845,000	4,567,000	84,000	260,000
10/07/11 18:00	2,172,482	0	0	2,069,000	4,566,000	108,000	502,200
10/07/12 09:00	2,133,743	0	0	2,094,000	4,565,000	124,000	226,900
10/07/08 11:00	2,274,896	0	0	1,957,000	4,563,000	97,000	214,400
10/07/06 17:00	2,421,560	0	0	1,879,000	4,563,000	107,000	251,500