Needs For and Alternatives To

APPENDIX B

Manitoba Hydro 2011/12 Power Resource Plan

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Manitoba Hydro 2011/12 Power Resource Plan

MANITOBA HYDRO 2011/12 POWER RESOURCE PLAN

Date: August 31, 2011

The purpose of the 2011/12 Power Resource Plan is to provide plans for the long-term power resource development for Manitoba Hydro which include:

- a recommended development plan for use in the 2011 Integrated Financial Forecast and the Capital Expenditure Forecast, and
- alternative development plans, which recognize the uncertainties associated with the recommended plan.

2011/12 Power Resource Development Plan – the Sales Package

The recommended power resource development plan includes the major infrastructure and resources to pursue a new 500 kV US interconnection and facilitate the Minnesota Power (MP) and Wisconsin Public Service sales as follows:

- Keeyask G.S. with a 2019/20 ISD,
- Conawapa G.S. with a 2024/25 ISD,
- A new US interconnection capable of meeting the MP and WPS sales requirements with an earliest ISD of 2019/20,
- The MH-MP Sale Agreements dated May 19, 2011,
- The WPS Sale Agreements dated May 19, 2011,
- A proposed 500 MW Sale to WPS
- A transmission allowance for additional north-south transmission beyond a 2000 MW Bipole III, as required for the combined Conawapa and Keeyask generation with a 2024/25 ISD.

2011/12 Alternative Power Resource Development Plans

Alternative Development Plan 1 – the 250 MW Interconnection Package

The alternative recommended power resource development plan which includes the major infrastructure and resources to pursue a new US interconnection and facilitate the MP sales as follows:

- Keeyask G.S with a 2019/20 ISD,
- Conawapa G.S. with a 2024/25 ISD,
- A new US interconnection capable of 250 MW export and 250 MW import with a 2020/21 ISD,
- The MH-MP Sale Agreements dated May 19, 2011,
- The WPS Sale Agreements dated May 19, 2011,
- A transmission allowance to account for additional north-south transmission beyond a 2000 MW Bipole III, as required for the combined Conawapa and Keeyask generation with a 2024/25 ISD.

Alternative Development Plan 2 – No New Interconnection

In the event that a new US interconnection and/or the Keeyask Project becomes unachievable, the alternative power resource development plan for major infrastructure and resources to meet Manitoba requirements without a new interconnection is as follows:

- Combined Cycle Gas Turbine with a 2021/22 ISD,
- Conawapa G.S. with a 2027/28 ISD

Inherent in these plans are the base resource assumptions, which can be found in Section 3 - Supply of Power. The Supply and Demand Tables for Dependable Energy and Capacity can be found in Appendix A. Supply and Demand Tables for Average Energy for both the recommended and alternative development plans can be found in Appendix B.

EXECUTIVE SUMMARY

The 2011/12 plan for power resources is the most recent corporately approved update of energy supply and demand for the Manitoba Hydro system and is based on information available prior to August 2011.

Under dependable energy conditions, new generation is required to meet Manitoba load requirements in 2020/21. The recommended development plan includes a new interconnection, Keeyask G.S. and Conawapa G.S. as well as the Wisconsin Public Service and Minnesota Power sales (the Sales Package)

Major supply assumptions to meet the Sales Package of the recommended development plan include:

- Keeyask G.S. in 2019/20
- Conawapa G.S. in 2024/25
- A new US interconnection by 2019/20
- Additional north-south transmission beyond a 2000 MW Bipole III by 2024/25

This resource plan also includes several projects that are required to ensure continued operation and reliability of the existing system and to recognize climate change legislation in Manitoba such as:

- Kelsey G.S. upgrade of 77 MW completed by 2012/13
- 16.5 MW of new wind generation at St. Leon in 2011/12
- Pointe du Bois powerhouse rebuild by 2030/31
- Bipole III – 2000 MW completed in 2017/18
- Restricted operation of Brandon Unit 5 (coal)

In May 2011 Manitoba Hydro signed agreements with Minnesota Power for a 15 year sale of 250 MW of System Power from 2020 to 2035. The sale is contingent on the construction of the Keeyask G.S. and a new US interconnection. In addition, a 100 MW System Power Sale Agreement from 2021 to 2029 was signed with Wisconsin Public Service The 100 MW System Power Sale is contingent on the construction of the Keeyask G.S. which is required to fulfill the obligations of the 250 MW Minnesota Power sale.

The term sheet for a long-term sale with Wisconsin Public Service (WPS Term Sheet) is currently being re-negotiated to reflect current conditions and WPS requirements. A key change in the 2011/12 plan is a deferral of the start date of a proposed sale from 2020/21 to 2025/26.

In July 2011 Manitoba Hydro entered into a power purchase agreement with Algonquin Power to purchase the output from the planned St. Leon II Wind Energy wind farm. The wind farm is scheduled to begin operation in January, 2012 and will be physically located within the footprint of the existing St. Leon Wind Energy wind farm with a plant size 16.5 MW.

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1. INTRODUCTION

The 2011/12 Power Resource Plan is the annual update to the long-term resource development plan to ensure that adequate resources are available to meet the electricity needs of the province of Manitoba. This report provides a recommendation on how to meet these needs through development plans that extend thirty-five years into the future.

The power resource plan supports the annual *Integrated Financial Forecast* and the long-term *Capital Expenditure Forecast* processes as well as other long-term planning and corporate initiatives.

1.1 Resource Planning Criteria

Power resource planning is an essential activity in fulfillment of Manitoba Hydro's mission as stated in the Corporate Strategic Plan:

> "To provide for the continuance of a supply of energy to meet the needs of the province and to promote economy and efficiency in the development, generation, transmission, distribution, supply, and end-use of energy."

Resource planning is governed by Manitoba Hydro Policy G195, Generation Planning which provides the following criteria:

> "1. Capacity Criteria
>
> Manitoba Hydro will plan to carry a minimum reserve against breakdown of plant and increase in demand above forecast of 12% of the Manitoba forecast peak demand each year plus the reserve required by any export contract in effect at the time.
>
> 2. Energy Resource Planning
>
> The Corporation will plan to have adequate energy resources to supply the firm energy demand in the event that the lowest recorded coincident river flow conditions are repeated. Planning studies, to meet the firm energy demand, may include up to a maximum of 10% of the energy demand in Manitoba to be supplied from the energy reserves on interconnected utilities, provided an energy purchase contract is or will be in effect during the time being studied."

Capacity Criteria

Manitoba Hydro is a member of the North American Electric Reliability Corporation (NERC). NERC's mission is to ensure the reliability of the North American bulk power system. According to NERC:

> "Achieving reliability in the bulk electric systems requires, among other things, that the amount of generating capacity resources exceed customer demands by some amount. That amount (expressed as a percent of peak demand is termed a

> reserve margin and when expressed as a percent of generating capacity is termed capacity margin) must be sufficient to cover planned maintenance and unplanned or forced outages of generating equipment, deratings in the capability of demand-side and supply-side resources, system effects due to reasonably anticipated variations in weather, variations in customer demands or forecast demand uncertainty, delays in the construction of generating capacity, and other system operating requirements." (NERC Resource and Transmission Adequacy Recommendations, June 15, 2004)

Manitoba Hydro plans its system capacity to maintain a reserve margin of generation above its peak load, which is expressed as a percent of peak load. The reserve margin is intended to protect against capacity shortfalls resulting from breakdown of generation equipment, or increases in peak load due to unexpected load growth or extreme weather conditions. Historically, the reserve margin of 12% has been adequate for Manitoba Hydro's predominantly hydro-electric generation based system because of relatively low outage rates combined with the relatively small size of hydro generating units. In comparison, reserve margins in predominantly thermal generation based systems are typically in the 15% to 18% range. The maximum demand for capacity in Manitoba occurs in the winter season, and therefore the winter peak capacity is evaluated in supply-demand tables for capacity.

Capacity available in the Manitoba Hydro system is supplied from:

- hydro-electric generating stations,
- thermal generating stations,
- projected Demand Side Management (DSM) savings not already accounted for in the load forecast, and
- imports from neighbouring utilities.

Energy Resource Planning

Also according to NERC:

> "In areas where the majority of supply-side resources are energy-constrained (such as the hydro-dominated Northwest [including Manitoba]), achieving reliability may also require that the energy available to the area is, at least, equal to the customer demand and some reserve requirement during a certain critical design period for the constrained resources." (NERC Resource and Transmission Adequacy Recommendations, June 15, 2004)

Manitoba Hydro's energy criterion recognizes the energy constrained limitation of hydraulic generation during drought conditions. This criterion requires that the Manitoba Hydro system be capable of supplying sufficient dependable energy resources, as measured in gigawatt-hours (GW.h), to meet firm energy demand in the event of a repeat of the lowest historic system inflow conditions. The firm energy demand is determined from the base level of forecasted Manitoba load and from existing export contracts. Historic system inflows are derived from the available record of river flows (1912 to 2008) which have been adjusted to represent present use conditions and to account for

systemic changes due to expected future water use and withdrawals upstream of Manitoba.

The dependable energy available in the Manitoba Hydro system is the total of energy supplied from:

- hydro-electric generating stations,
- thermal generating stations,
- wind generation,
- projected DSM savings not already accounted for in the load forecast, and
- imports from neighbouring utilities.

The energy criterion limits the extent that imports can be relied upon to supply Manitoba demand. Plans for adequate resources may include imports from neighbouring utilities of up to 10% of the forecast Manitoba energy demand.

All development plans proposed and evaluated in this report use these planning criteria to provide the basis for determining when new resources are required to ensure an adequate supply of capacity and energy for Manitoba.

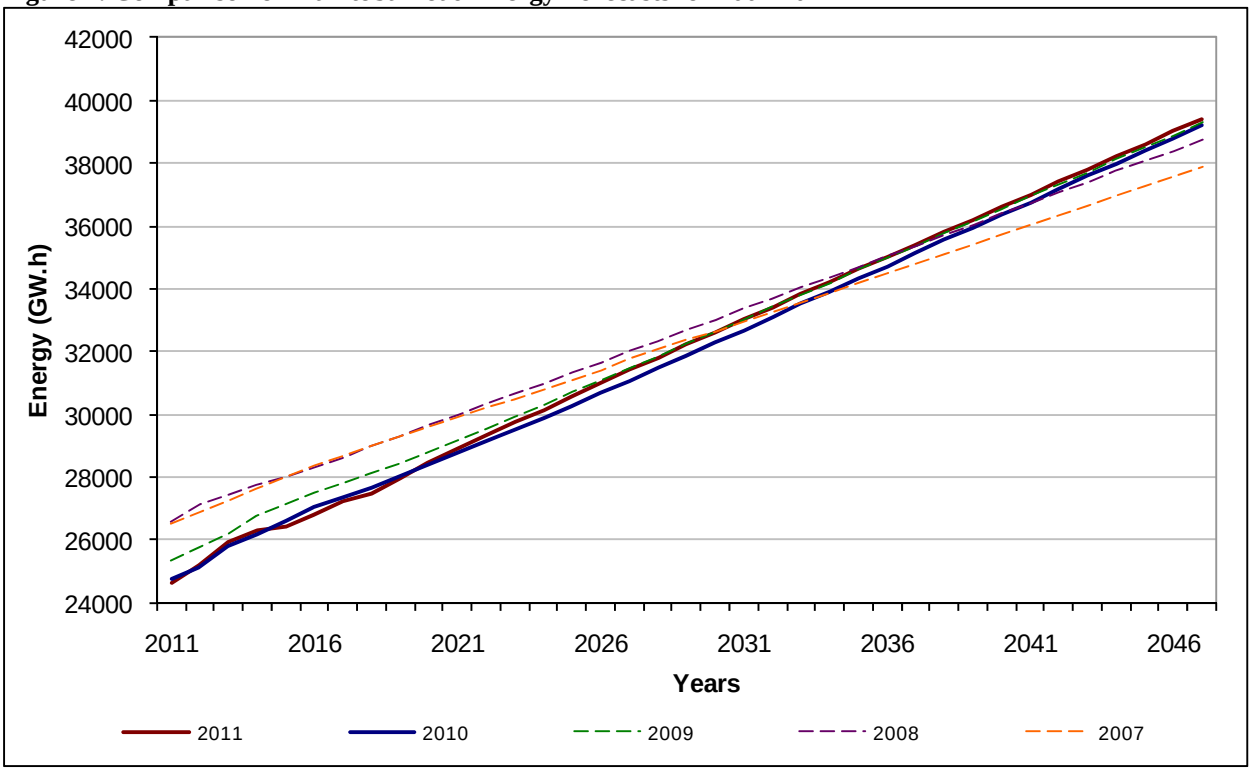
2. DEMAND FOR POWER

Demand for power consists of Manitoba domestic load, which includes residential, commercial and industrial sectors, and requirements from export contracts. The following sections provide a summary of the 2011 energy and capacity forecasts and contract provisions and a discussion of the changes from 2010**.**

2.1 Electric Load Forecast

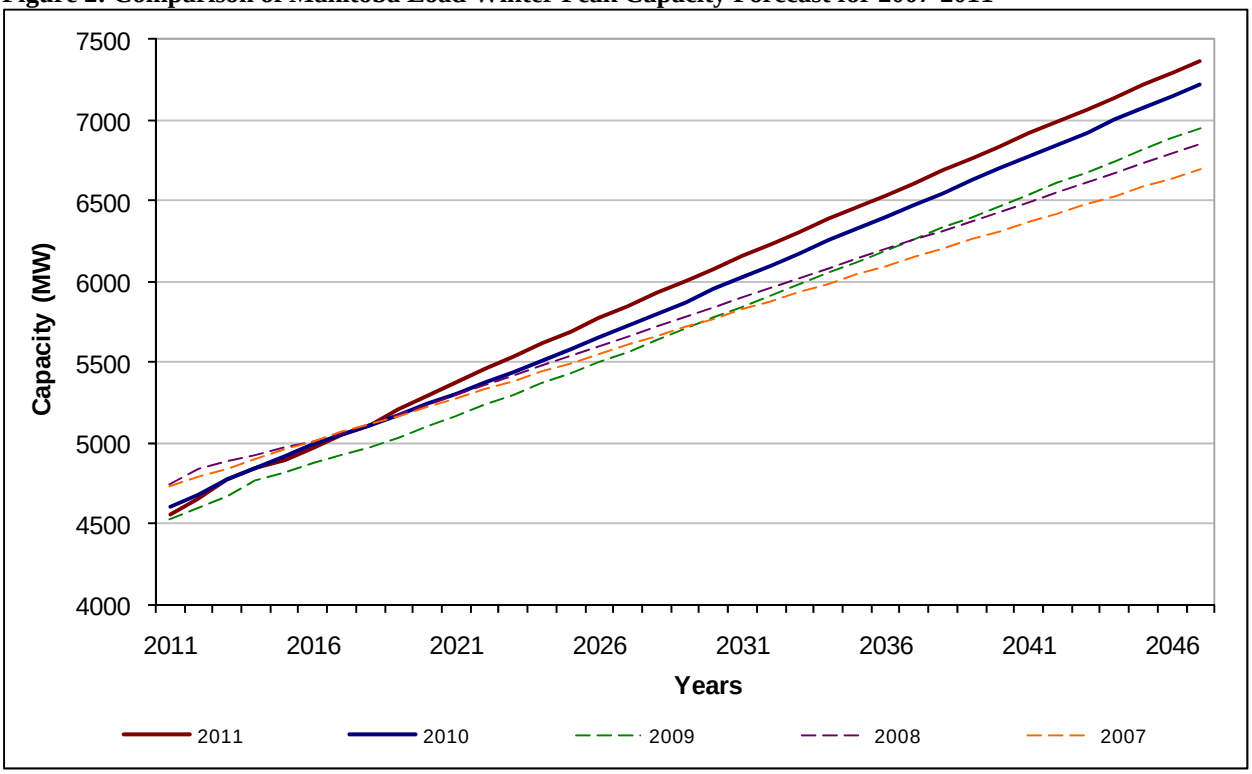
The *2011 Electric Load Forecast*, prepared by the Market Forecast Department, provides Manitoba Hydro's forecast of the Manitoba domestic load. As shown in Figure 1 the 2011 load forecast for energy is similar to the 2010 forecast with a slight decrease in the early years followed by an increase of approximately 250 GW.h beginning in 2021. This increase is the net effect of an increase in residential and general service consumption offset by a decrease in the general service top consumers.

Figure 1: Comparison of Manitoba Load Energy Forecasts for 2007-2011



Although the forecast for Manitoba energy consumption is expected to be moderately higher than last year, peak Manitoba demand is expected to increase by about 125 MW or approximately 2% over the 2010 forecast. Manitoba peak demand is expected to increase faster than energy consumption because the sectors increasing the most (residential and general service) have low load factors (high peak relative to energy), as compared to the sector decreasing (general service top consumer) which has a high load factor (low peak relative to energy). In addition a remodeling and recalibration of the peak by the Market Forecast Department in 2010 resulted in a significant increase in the peak forecast over the long term.

Figure 2: Comparison of Manitoba Load Winter Peak Capacity Forecast for 2007-2011



2.2 Long-Term Export Contracts

Long-term contracts by definition have a duration of greater than six months. Long-term dependable export obligations refer to sales that are sourced from dependable energy resources and must be served under all historic water flow conditions including the lowest flow on record. Long-term export obligations under dependable flow conditions may be less than the obligation under higher flow conditions and are governed by the terms of each individual contract.

New Sales Agreements with Minnesota Power

In May 2011 Manitoba Hydro and Minnesota Power (MP) entered into two agreements providing for (i) a 250 MW system power sale to Minnesota from June 2020 to May 2035 and (ii) an Energy Exchange Agreement to provide Manitoba Hydro with firm transmission service to import energy during the period June 2020 to May 2035. The 250

MW System Power Sale Agreement is conditional upon the construction of major new hydroelectric generating facilities and associated transmission in Manitoba and a new interconnection between Manitoba and the US.

New Sales Agreement with Wisconsin Public Service Corporation

In May 2011, based on a term sheet signed in 2008 which set out the significant terms for a 500 MW system power sale, Manitoba Hydro and Wisconsin Public Service entered into a 100 MW System Power Sale Agreement for the period June 2021 to May 2027. This sale is contingent on the construction of the new hydroelectric generation in Manitoba.

3. SUPPLY OF POWER

This section describes resources that form the base supply available to meet Manitoba load requirements and identifies when new base supply resources are required.

Base supply is common to all development plans, and may be sourced from existing resources or from expected resources. Existing resources include generating resources currently available within Manitoba and contracted imports from external markets. Expected resources are those to which Manitoba Hydro has committed or for which there is a reasonable expectation that Manitoba Hydro will commit. Expected resources include those presently under construction, proposed Supply-Side Enhancements (SSE), replacement or upgrading of existing resources, improvements due to transmission upgrades, DSM, and non-contracted imports from extra-provincial markets.

3.1 Existing Resources

Table 1 provides a listing of existing resources, including contracted imports, and the available energy and capacity from these resources. It is assumed that sufficient maintenance and investment in rehabilitation will continue to sustain the generating capability of existing resources throughout the study period. Any additional investment expected for the existing system is included in the Integrated Financial Forecast.

Dependable energy shown in Table 1 for existing hydro facilities will be slightly different than that shown in the supply-demand tables in Appendix A. The supply-demand tables account for an annual reduction in dependable energy of 15 GW.h on average to reflect reduction in system inflow due to anticipated increases in irrigation and other consumptive uses of water in Saskatchewan and Alberta.

Table 1: Existing Resources

Station	Winter Peak Capacity (MW)	Energy Produced Under Flow Condition (GW.h)		
		Dependable	Average	Maximum
Hydro Total	4,898	21,170	29,240	35,392
Thermal Total	517	4,118	29,240	143
System Total	5,415	25,288	29416	35,588
Wind Total	0	755	888	888
Imports	550	2705	varies	minimal
Total Available Resources	5965	28,777	30337	36509

Notes:

- Average energy is the average of the annual generation from the full range of historic flows.
- Maximum energy is the generation which would occur for the maximum historic system flow (2005/06).
- Thermal resources are assumed to operate to their full potential for dependable energy, and are assumed to operate at their minimum for average and maximum flow conditions.
- Wind generation is not dependant on flow conditions. Annual energy projections are estimated through statistical wind resource assessments.

The following provides a summary of additional information, notable assumptions and/or current status updates for existing resources.

Brandon Generating Station Unit 5 - Coal-Fired Generation

Retirement Assumption

Unit 5, Manitoba Hydro's sole remaining coal fired generating unit, is assumed to remain available until March of 2019.

The Climate Change and Emissions Reductions Act

Brandon Unit 5 is governed by *The Climate Change and Emissions Reductions Act* and its subsequent *MR 186/2009, the Coal-Fired Emergency Operations Regulation* which restricted coal-fired operation to "…*support emergency operations*".

Operation of Brandon Unit 5 will occur for two main purposes as defined in *MR 186/2009, the Coal-Fired Emergency Operations Regulation*: mitigation of adverse water conditions commonly referred to as "drought", and to provide system reliability support.

In order to maintain the effective power generation capability of Unit 5 for either of these purposes, preparation for emergency support will be necessary. It is estimated that operation for this purpose will generate approximately 100 GW.h/year. An additional

25 GW.h/year may be required for emergency service resulting in estimated Unit 5 generation to be in the order of 125 GW.h/year.

Under the conditions previously described, Brandon Unit 5 can continue to operate up to its maximum capability of 811 GW.h/year (northern equivalent). Unit 5 generation is assumed to be available to meet all commitments existing prior to the introduction of the Act. In the future however, Brandon Unit 5 energy shall not be considered available to supply new sales including future long-term dependable export sales.

Environment Act License Review (EALR)
As part of an on-going public license review by Manitoba Conservation, Manitoba Hydro submitted an Environmental Impact Statement (EIS) in December 2006.

Progress on the license review was temporarily halted pending passage of the Manitoba *Climate Change and Emissions Reductions Act* in 2008 and its subsequent regulation, *MR 186/2009, the Coal-Fired Emergency Operations Regulation* in November 2009. The license review process resumed following formal adoption of the new regulation. An update to the 2006 EIS was submitted to Manitoba Conservation in early 2011, which concluded that the original 2006 EIS submission remains valid and applicable to the EALR process. Manitoba Conservation continues to review the 2011 update of the EIS submission.

Brandon Generating Station Units 6 and 7 - Natural Gas-Fired Generation
The annual firm energy assumption of 2354 GW.h for Brandon Units 6-7 remains unchanged from previous power resource plans. The firm capacity (Winter Peak) assumption remains unchanged from the 2010/11 Power Resource Plan at 280 MW reflecting the results of Uniform Rating of Generating Equipment (URGE) testing.

Brandon Units 6-7 are assumed to remain in operation to the end of the planning horizon assuming routine capital investment.

Selkirk Generating Station Units 1 and 2 - Natural Gas-Fired Generation
Selkirk is assumed to remain in operation to the end of the planning horizon assuming only routine capital investment.

Wind Generation - Power Purchases
For planning purposes, contracted purchases of wind generation are expected to be renewed using the same terms and conditions after the expiration of the current contracts and to extend through to the end of the study period.

Of the expected annual generation from wind resources, 85% is relied upon as dependable energy. The 85% factor for determining dependable wind generation was adopted by Manitoba Hydro from experience in other jurisdictions. This was based on statistical analysis of wind records for extended periods of time in these jurisdictions. The standard that was adopted required that the dependable energy could be achieved in

19 years out of 20. The annual wind generation is expected to be at least 85% of the average annual wind generation in 19 years out of 20.

Wind generation is not assigned any capacity for the purposes of meeting winter peak loads because it is not assured to be available at the time of system peak loads, and in fact is likely to be inoperable due to cold weather limitations.

St. Leon Wind Energy
Manitoba Hydro has a 25 year power purchase agreement (PPA) with St. Leon Wind Energy LP for the output of St. Leon Wind Energy. Based on a 100 MW capability, for planning purposes, the dependable energy is 291 GW.h annually and the average annual energy is 342 GW.h.

St. Joseph Wind Farm
Manitoba Hydro has a 27 year PPA with Pattern Energy Group LP for the output of the 138 MW St. Joseph Wind Farm. Based on the 138 MW capability, for planning purposes, the dependable energy is 464 GW.h annually and the average annual energy is 546 GW.h. The facility began commercial operation on April 1, 2011.

Energy and Capacity Imports
Manitoba Hydro has three long-term seasonal diversity contracts which provide a total of 500 MW of winter capacity and dependable energy imports during the winter season in exchange for exports of 500 MW of capacity and energy during the summer season. In addition, Manitoba Hydro has a 500 MW energy services agreement which provides year-round energy but is not capacity backed.

Manitoba Hydro does not have firm import transmission with either Ontario or Saskatchewan and as such does not plan on firm imports from these markets.

When possible, Manitoba Hydro continues to import energy during lower import price periods, to facilitate sales opportunities during higher export priced periods to maximize the revenue opportunities available to Manitoba Hydro.

New Agreements with Minnesota Power
In May 2011 Manitoba Hydro and MP entered into two agreements effective June 1, 2020. The agreements provide Manitoba Hydro with up to 250 MW of firm import transmission in all hours for the term of the contract over a new US interconnection. As mentioned in Section 2.2, the MH-MP Sale and related infrastructure are subject to regulatory review and approval in Canada and the U.S.

3.2 Expected Resources

Beyond existing resources there are resources to which Manitoba Hydro has committed or for which there is a reasonable expectation that Manitoba Hydro will commit. These resources contribute to the overall ability to meet energy and capacity requirements over the study period. Approval or evaluation of these resources is not the focus of this power

resource plan. Table 2 provides a listing of expected resources and the available energy and capacity from these resources.

Table 2: Base Expected Resource Assumptions

Project	Winter Peak Capacity (MW)	Energy Produced Under Flow Condition (GW.h)		
		Dependable	Average	Maximum
Wuskwatim 2011/12 ISD	200	1250	1520	TBD
Pointe du Bois rebuilt (incremental) 2030/31 ISD	43	150	250	320
St. Leon II Wind Energy 16.5 MW 2011/12 ISD	0	65	77	77
SSE-Kelsey Rerunnering (incremental from all 7 units) by 2012/13	77	0	350	450
Bipole III Loss Reductions 2017/18 ISD	89	243	392	N/A
DSM by 2025/26 (incremental)	256	1008	1008	1008
Non-Contracted Imports	0	1100 to 1575	varies	minimal

Notes:

1. TBD - to be determined.
2. N/A - not available.
3. The winter peak capacity is an estimate of the contribution of an individual plant to the system for typical winter conditions, and is not necessarily the same as the URGE testing values.
4. Average energy is the average of the annual generation from the full range of historic flows.
5. Maximum energy is the generation which would occur for the maximum historic flow (2005/06).
6. Resources other than hydro are converted to northern equivalent.
7. Wind generation is not dependant on flow conditions. Annual energy projections are estimated through statistical wind resource assessments.
8. Bipole III loss reductions will diminish as additional HVdc generation is placed in service.

Wuskwatim Generating Station
Construction of the 200 MW Wuskwatim Generating Station started in 2006 and is scheduled to be in-service in early 2012. The scheduled individual unit ISDs assumed in this power resource plan are March 3, 2012 for Unit 1, June 18, 2012 for Unit 2, and May 3, 2012 for Unit 3.

Pointe du Bois Generating Station
For the 2011/12 Power Resource Plan the Pointe du Bois powerhouse is assumed to be rebuilt with an increase of 43 MW and 150 GW.h (existing and future capability is under review) over existing plant ratings, similar to the 2010/11 Power Resource Plan, with first power in 2030/31. Until Pointe du Bois is rebuilt, it is assumed that the existing facility will be maintained to continue to operate at or near full capacity.

New Wind Generation Power Purchase
Manitoba Hydro entered into a PPA with Algonquin Power to purchase the output from the planned St. Leon II Wind Energy wind farm. The wind farm will be physically situated within the footprint of the existing St. Leon Wind Energy and will share a common substation and transmission interconnection point. St. Leon II Wind Energy will add 16.5 MW and is scheduled to begin operation on January 1, 2012.

Supply-Side Enhancements
The Manitoba Hydro system is continuously reviewed for opportunities to upgrade infrastructure to enhance the supply of power. Supply Side Enhancement (SSE) projects go beyond routine maintenance required to maintain supply and often come about due to major maintenance upgrades. SSE projects are subject to economic evaluations, similar to other major resource projects. A number of SSE initiatives are currently underway including the Kelsey Rerunnering Project and several projects on the Winnipeg River system.

Kelsey Rerunnering
The major upgrade of Kelsey consists of the replacement of all seven turbine runners and generator windings resulting in increased plant capacity and greater utilization of Nelson River inflows. This upgrade is expected to be fully completed in the 2012/13 fiscal year and has the potential to increase the plant rating by 77 MW.

Upgraded turbines will have approximately 30% greater discharge capability than existing units and will capture roughly 30% more of the energy during average to above average flow periods primarily through reduced spill. While the rerunnering project will not increase dependable energy at Kelsey, there will be an increase in average energy of about 350 GW.h/year when the project is complete. In addition, each of the seven units at Kelsey is expected to gain about 11 MW of capacity for an overall gain of roughly 77 MW. To date, five units have been replaced resulting in an increase in capacity of about 55 MW. For the purpose of the 2011/12 Power Resource Plan, a net increase of 55 MW in 2011/12 and 77 MW is fully included by 2012/13. Once the Kelsey Rerunnering Project has been completed, both the capacity gains and energy gains will be confirmed after performance testing is completed.

Winnipeg River Rerunnering

There are rerunnering opportunities on the Winnipeg River, as these plants are over 50 years old and are undergoing major equipment maintenance and repairs. Winnipeg River plants were originally estimated to provide 560 MW of capacity, which has degraded somewhat over the years. Recent upgrades have, in part, restored the Winnipeg River to original ratings as opposed to increasing the nominal plant rating.

The Winnipeg River plants will need to be studied in more detail to determine what portion of the upgrades simply restores previous capability, and what portion provides new opportunity. Consistent with previous power resource plans, the potential increased plant capability is not included as an incremental addition due to the uncertainty in the increase relative to overall initial and existing Winnipeg River capability.

Loss Reduction due to Bipole III

Bipole III continues to be needed to satisfy reliability requirements within Manitoba, and also results in notable reductions in transmission losses prior to new northern generation. Bipole III, routed on the west side of lakes Manitoba and Winnipegosis, continues to be planned for a 2017/18 ISD, the earliest date that it could be available based on anticipated planning and regulatory requirements. Concept engineering for the Bipole is being finalized including selection of the overall capacity.

Bipole III does not provide any new generation, but is expected to reduce the transmission losses which exist on the HVDC system. By using all three bipoles to transmit the lower Nelson River generation, rather than just the existing two, the losses are reduced, resulting in 89 MW and 243 GW.h/year of reduced losses under drought conditions (same as the 2010/11 Power Resource Plan). This benefit has been included and is adjusted downward as new generation increases the loading.

Demand Side Management

Incremental DSM included in the 2011/12 Power Resource Plan is 256 MW and 1008 GW.h achieved by 2025/26. Incremental DSM included in the power resource plan excludes savings already achieved to date; and savings achieved through codes and standards which are included in the Load Forecast; and portions of savings from customer self-generation and curtailable rates programs that do not qualify as winter peak capacity or dependable energy.

4. NEED FOR NEW RESOURCES TO MEET EXISTING OBLIGATIONS

The need for new resources to meet the expected load requirements is assessed using supply assumptions which include both the base and expected resources as discussed in Section 3 - Supply of Power and the Manitoba base load forecast and export sales requirements as discussed in Section 2 - Demand for Power. Using the planning criteria, the supply-demand surplus or deficit is determined for each year, for 35 years into the future. The year that deficits begin for either dependable energy or peak capacity is the year that new resources are required.

Table 3 shows the changes over the last three years in the dates that new resources were needed for both energy and capacity. The variation in the date new resources are needed is due to changes in the load forecast, DSM, and base resource assumptions such as the timing of new wind generation and rebuilding of the Pointe du Bois powerhouse, and contract obligations.

Table 3: Changes to Supply-Demand Balances in the Last Three Years

Changes to Supply-Demand System Surplus in the Last Three Years 2009/10, 2010/11 and 2011/12															
	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
Dependable Energy (GWh)															
2009/10	1686	2155	1823	1231	3175	2596	2350	1935	785	452	120	-227	-562	-938	-1354
2010/11	1353	1888	1350	1252	2213	1910	1897	1637	470	125	-218	-570	-925	-1302	-1525
2011/12	**823**	**1826**	**1256**	**990**	**2212**	**2062**	**1877**	**1666**	**406**	**-48**	**-454**	**-856**	**-1251**	**-1656**	**-1866**
Winter Peak Capacity (MW)															
2009/10	792	823	702	594	1264	1003	1053	765	352	290	228	165	101	31	-53
2010/11	617	642	493	457	420	356	398	345	175	110	45	-21	-89	-160	-287
2011/12	**448**	**625**	**447**	**395**	**389**	**327**	**343**	**291**	**102**	**17**	**-65**	**-146**	**-226**	**-305**	**-413**

5. RESOURCE OPTIONS

As part of the resource planning process, Resource Planning & Market Analysis maintains information on a variety of resource supply options which are potentially available to meet future Manitoba requirements. A listing of these resource options is provided in Appendix C.

The following is a description of the resource options included in the 2011/12 recommended and alternative development plans.

Keeyask Generating Station
Keeyask G.S. is planned to be a seven unit plant located upstream of Kettle G.S. on the Nelson River. The current design rating for Keeyask G.S. is 695 MW, which reflects the maximum generation potential when Stephens Lake is drawn down. The nominal winter peak rating for Keeyask G.S. is 630 MW. Keeyask G.S. will not impact the capacity of any other plants and is not significantly affected by ice conditions, therefore, the nominal capacity and net system addition are both 630 MW.

Six years of construction is projected for Keeyask G.S. first unit in-service. An additional two years will be required to complete construction. The earliest in service date assumed for Keeyask G.S. is 2019/20.

In May, 2009 Manitoba Hydro and the Keeyask Cree Nations (Tataskweyak Cree Nation and War Lake First Nation operating as the Cree Nation Partners CNP, York Factory First Nation, and Fox Lake Cree Nation) signed the Joint Keeyask Development Agreement setting out the terms of the First Nations participation in the remainder of project planning, the environmental assessment process, and in construction and operation of the project. Each of the Keeyask Cree Nations has also signed individual Adverse Effects Agreements to address the environmental and socio-economic effects of the project on their membership. Prior to the signing of these agreements each of the Keeyask Cree Nations voted, through a referendum of band members, to become limited partners in the project and to accept individual Adverse Effects Agreements. The Keeyask Cree Nations have been intensively involved in project planning and environmental assessment since the early 2000's.

Environment Act License for the Keeyask Infrastructure Project was issued in March 2011 and the environmental field work for the Keeyask Generating Station and related works is essentially complete. In June 2011, the Manitoba Hydro Electric Board authorized the Corporation to commence construction of the KIP in the summer of 2011 to preserve the 2019 in service date.

Conawapa Generating Station
Conawapa G.S. is planned to be a ten unit plant located downstream of the Limestone G.S. on the Nelson River. The current design rating for Conawapa G.S. is 1485 MW during open water conditions. Initial impoundment of the forebay will reduce Limestone G.S. output by 90 MW, resulting in a net increase in system summer capacity of 1395 MW. Downstream ice conditions will reduce Conawapa G.S. output by about 55 MW and similarly ice conditions will further reduce Limestone G.S. by about 40 MW during winter peak conditions resulting in a nominal net system addition of 1300 MW.

The earliest in-service date assumed for Conawapa G.S., is 2024/25. In order to reduce overlap on internal and external skilled labour and other resources, there must be at least four years between the in service dates of Conawapa G.S. and Keeyask G.S. To achieve a 2024/25 in service date, licenses and construction authorizations are required in mid-2015 and infrastructure construction would need to begin in late 2015/2016.

The Conawapa G.S. project will be located within the Fox Lake Resource Management Area. The provincial government and Manitoba Hydro have signed a Memorandum of Understanding with Fox Lake First Nations related to the Conawapa G.S. project.

The corporation has also entered into Process Agreements with First Nations in the vicinity of Conawapa. These agreements provide the current funding framework for First Nations' participation in planning and development activities related to the Conawapa G.S. project. Agreement participation includes the following First nations:

- Fox Lake Cree Nation
- York Factory First Nation
- Tataskweyak Cree Nation and War Lake First Nation working together as the Cree Nations Partners (CNP)

In addition, Manitoba Hydro has signed a Letter of Agreement with the Shamattawa First Nation. While working group structures have been developed for local First Nation involvement and some working groups have been launched, a comprehensive framework for local First Nation participation in project benefits remains to be determined.

Conawapa G.S. concept engineering is ongoing. Site layout for much of the supporting infrastructure has been completed. The access road to the site is in place as it was built before the original Conawapa G.S. project was suspended in 1992.

Environmental field work for the generating station and related works has been underway for several years, building upon the environmental assessment work conducted in the late 1980s and early 1990s.

Natural Gas-Fired Generation

Natural gas-fired Simple Cycle Gas Turbines (SCGTs) and Combined Cycle Gas Turbines (CCGTs) have relatively short construction lead times from the date of project commitment and flexibility in design parameters due to the variety of available configurations. SCGTs are available in capacities ranging from 30 MW to 200 MW with lead times to approve, procure and install of three to five years. CCGTs are available in capacities ranging from 150 MW to 800 MW with lead times to procure and install of three to five years.

6. OPPORTUNITIES

Opportunities may prompt a new resource or group of new resources to be selected or advanced for consideration in a development plan. These opportunities have enabled Manitoba Hydro to promote economy and efficiency in the development, generation, and transmission of power.

The recommended development plan of the 2011/12 Power Resource Plan pursues a new interconnection to the US, which is made possible by large sales to Minnesota Power and Wisconsin Public Service. These sales require a resource plan with large hydro resources. These resources are capable of serving the sales as well as Manitoba load requirements. As a virtually non-emitting resource, hydro has appeal to both domestic and export customers. The sales will facilitate a new US interconnection which will provide an outlet for the surplus capacity from building large plants and for surplus energy which results from favorable water conditions.

This new interconnection will improve energy security and reliability within Manitoba by providing greater access to the large pool of generation in MISO. The increased market access provided by the interconnection will facilitate additional higher valued export sales which increase net revenues and consequently subsidize customer rates. In addition, by facilitating the sale of a greater quantity of hydroelectric generated electricity to the MISO region, the interconnection will play a role in displacing generation and associated emissions from thermal units.

6.1 The Sales Package

In May, 2011 Manitoba Hydro finalized two sales contracts with Minnesota Power (MH-MP Sales) which are contingent on the construction of major new hydro-electric generation facilities in Manitoba and new transmission in Manitoba and the US. A key change from 2010/11 is a three year advancement of the start date to June 2020.

In May, 2011 Manitoba Hydro and WPS entered into a 100 MW sale agreement over existing transmission but contingent on the construction of major new hydroelectric generation in Manitoba.

Negotiations are continuing to expand the Wisconsin power sale to up to 500 MW which will require the construction of Conawapa G.S. and new transmission in Manitoba and the US beyond what is provided in the MH-MP Sale. For this power resource plan a 500 MW WPS Sale has been included with start date of June 2025.

6.2 New Interconnection Details

Detailed design of a new interconnection for the Sale Package, including route location, voltage, and line capability has not yet begun. New interconnection capability of 1000 MW for export (south) and 750 MW for import (north) has been assumed in the 2011/12 plan. The new interconnection is assumed to have an earliest in service date of 2019/20 which is coincident with the in service date for the Keeyask G.S and the start date of the MH-MP Sale.

In the event that the Sale package does not proceed, a new interconnection with 250 MW of both export and import transfer capability and in-service date of 2020/21 to facilitate the MP contract is included in the 2011/12 plan.

6.3 Increased Import Capability

The MH-MP Sale and WPS term sheet provide Manitoba Hydro with the ability to import additional energy into the Manitoba Hydro system. Increased import capability would improve the security and reliability of supply in Manitoba under both low flow and system contingency conditions.

7. POWER RESOURCE DEVELOPMENT PLANS

The following provides a description of the recommended and alternative development plans. These resource options are driven by the need for additional capacity and dependable energy resources. As shown in Section 4, resources are needed in 2020/21 to meet dependable energy requirements and in 2021/22 to meet peak capacity requirements. The development plans were prepared to ensure that energy and capacity demand is met over the entire 35 year planning period. Keeyask G.S. or gas-fired resources could be in-service in time to meet this need, while additional resources are required to bridge to Conawapa G.S. which has an earliest ISD of 2024/25.

2011/12 Power Resource Development Plan - The Sales Package

The recommended power resource development plan includes the major infrastructure and resources to pursue a new 500 kV interconnection and facilitate the MP and WPS sales as follows:

- Keeyask G.S. with a 2019/20 ISD,
- Conawapa G.S. with a 2024/25 ISD
- A new US interconnection capable of meeting the MP and WPS sales requirements with an earliest ISD of 2019/20
- The MH-MP Sale Agreements dated May 19, 2011
- The WPS Sale Agreements dated May 19, 2011
- A proposed 500 MW Sale to WPS
- A transmission allowance to account for additional north-south transmission within Manitoba.

2011/12 Alternative Power Resource Development Plans

Alternative Development Plan 1 – the 250 MW Interconnection Package

The alternative recommended power resource development plan which includes the major infrastructure and resources to pursue a new US interconnection and facilitate the MP sales as follows:

- Keeyask G.S. with a 2019/20 ISD,
- Conawapa G.S. with a 2024/25 ISD,
- A new US interconnection capable of 250 MW export and 250 MW import with a 2020/21 ISD,
- The MH-MP Sale Agreements dated May 19, 2011
- The WPS Sale Agreements dated May 19, 2011
- A transmission allowance to account for additional north-south transmission within Manitoba.

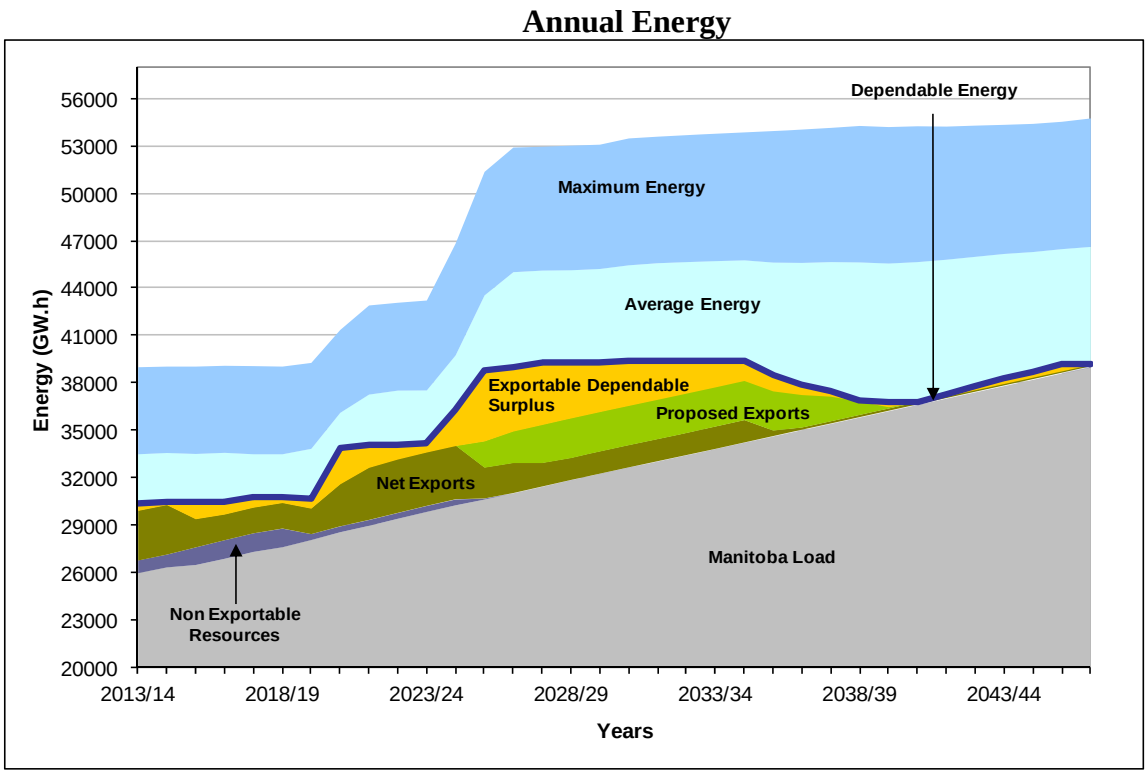
Alternative Development Plan 2 – No New Interconnection

In the event that a new US interconnection and/or the Keeyask Project becomes unachievable, the alternative power resource development plan for major infrastructure and resources to meet Manitoba requirements without a new interconnection is as follows:

- Combined Cycle Gas Turbine with a 2021/22 ISD
- Conawapa G.S. with a 2027/28 ISD

Figures 3 through 5 show the dependable and average energy and winter peak capacity supply-demand balances for each of the development plans studied.

Figure 3: 2011/12 Power Resource Development Plan – the Sales Package
The Sales Package – Keeyask G.S. in 2019/20 followed by Conawapa G.S. in 2024/25 and SCGT's afterwards as required, 500 kV interconnection in 2019/20



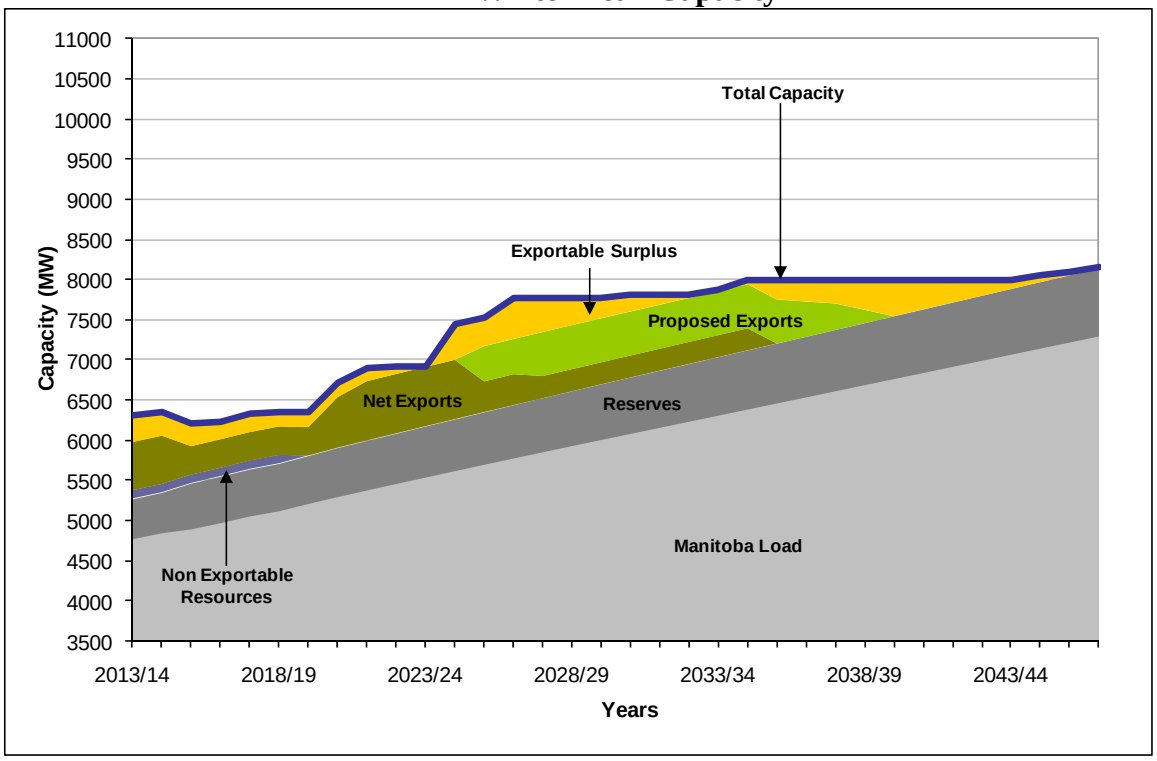
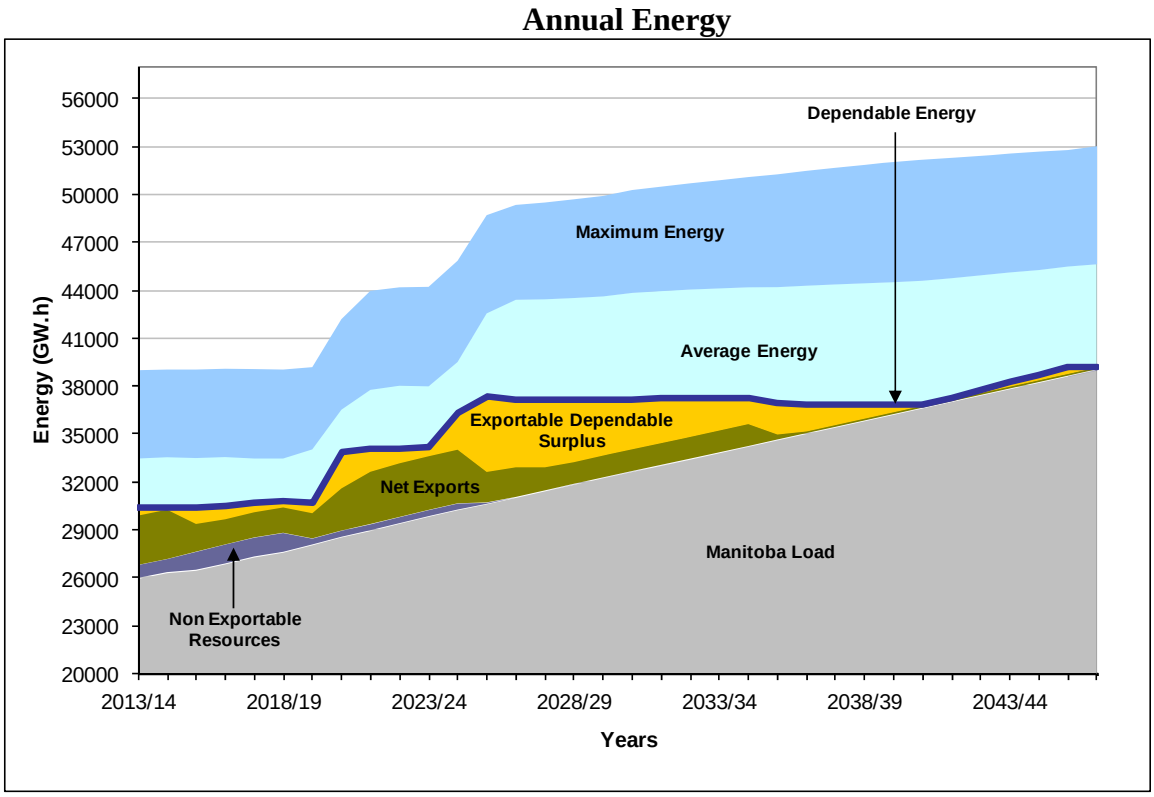


Figure 4.: Alternative Development Plan 1 – the 250 MW Interconnection Package
Keeyask G.S. in 2019/20 followed by Conawapa G.S. in 2024/25 and SCGT's beginning in 2041/42 as required, 250 MW interconnection 2020/21



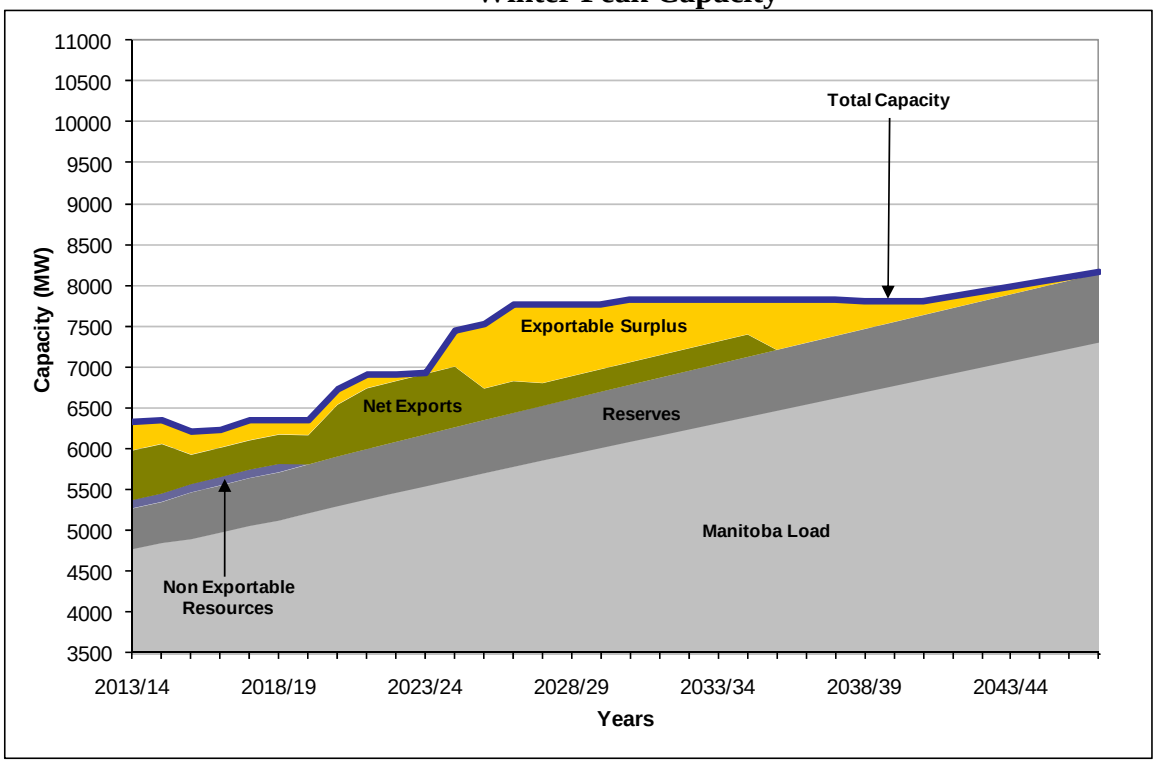
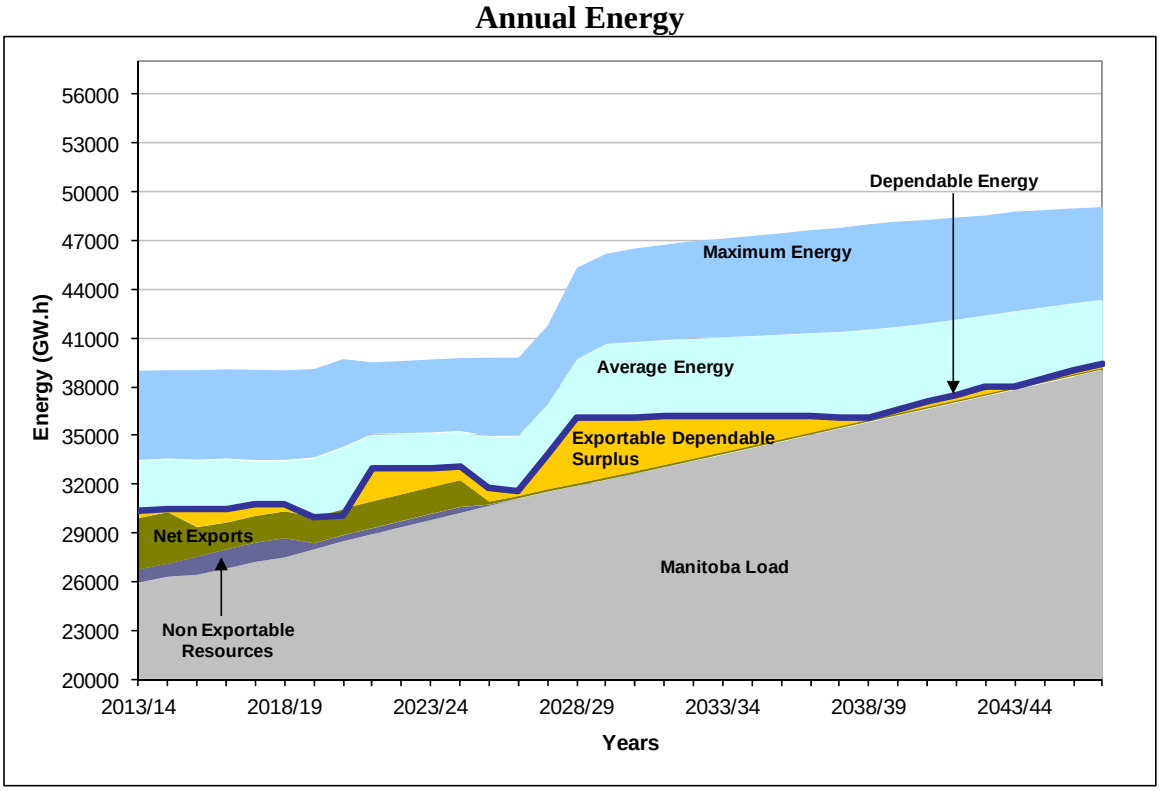
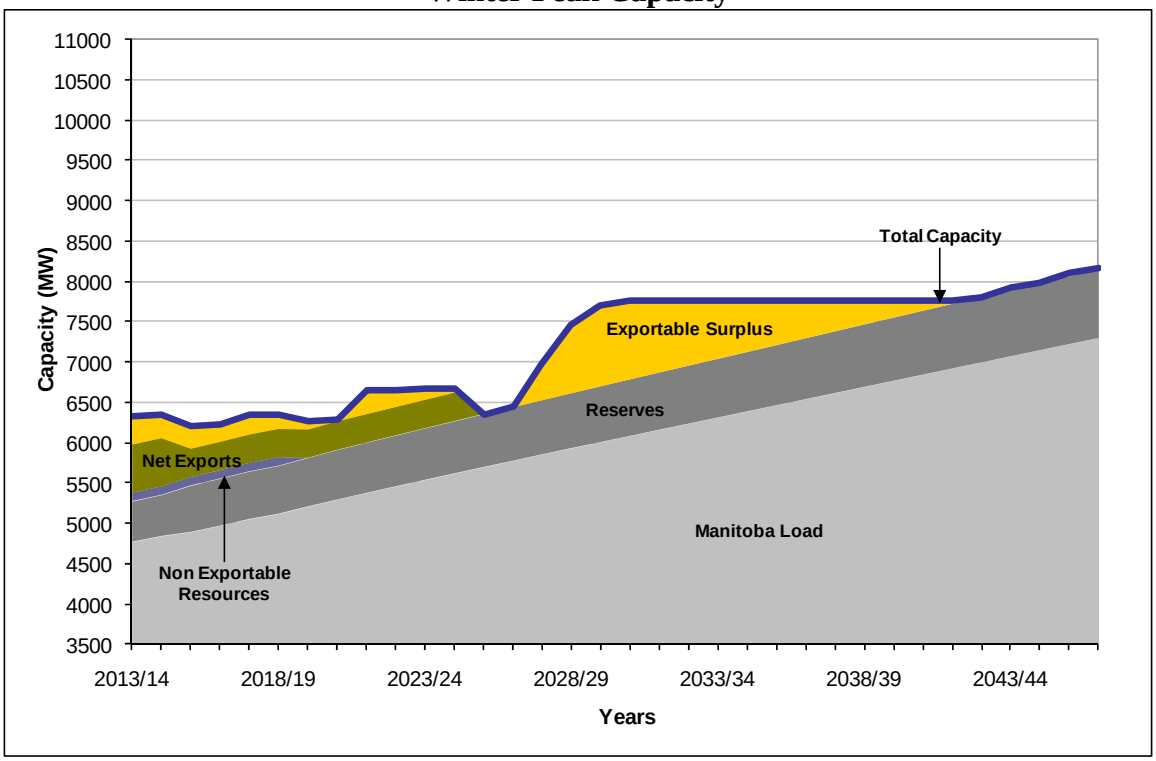


Figure:5 Alternative Development Development Plan 2 – No new Interconnection
CCGT 2021/22 followed by SCGTs bridging to Conawapa G.S. in 2027/28 and SCGT's after when required





8. CONCLUSIONS

Under dependable energy conditions, new generation is required to meet Manitoba load requirements in 2020/21.

The recommended development plan includes the development of Keeyask and Conawapa, as well as sales to Wisconsin Public Service and Minnesota Power (the Sales Package). This recommended development plan will also facilitate the building of a new 500 kV interconnection to Wisconsin and Minnesota. A new US interconnection will provide on-going financial, reliability, energy security and environmental benefits for many years, well beyond the term of the sales agreements.

In the event that the 500 kV interconnection Sales Package becomes unachievable the alternative development plan continues to include the 250 MW MH-MP Sale which will facilitates a new 250 MW US interconnection.

In the event that a new US interconnection and/or the Keeyask Project becomes unachievable the alternative development plan to meet Manitoba requirements would include a combined cycle gas turbine followed by Conawapa.

APPENDICES

A DEPENDABLE SUPPLY AND DEMAND TABLES

No New Generation

System Firm Winter Peak Demand and Resources (MW)

2011 Base Load Forecast, 2011 DSM - Option 2

Kelsey Rerunnering, Pointe du Bois Rebuild 2030/31, Brandon Unit 5 until 2018/19, Wuskwatim 2011/12, Bipole III Line (West) 2017/18

Fiscal Year	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
Power Resources																		
Existing Manitoba Hydro Plants	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900
New Hydro																		
Wuskwatim		200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Supply Side Enhancement Projects																		
Kelsey Rerunnering	55	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77
Pointe du Bois																		
Bipole III HVDC Line NET							89	89	89	89	89	89	89	89	89	89	89	89
Manitoba Thermal Plants																		
Brandon Unit 5	105	105	105	105	105	105	105	105										
Selkirk Gas	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132
Brandon Units 6-7 SCGT	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280
Committed Wind																		
Demand Side Management	25	47	72	99	127	150	169	186	200	214	222	231	240	249	256	241	241	241
Contracted Imports	550	550	550	550	385	385	385	385	385	385	385	385	385	385				
Total Power Resources	6047	6291	6316	6343	6206	6229	6337	6354	6263	6277	6285	6294	6303	6312	5934	5919	5919	5919
Peak Demand																		
2011 Base Load Forecast	4557	4649	4767	4840	4888	4967	5050	5115	5203	5293	5374	5455	5535	5615	5695	5773	5851	5928
Contracted Exports	638	605	605	605	358	358	358	358	358	358	358	358	358	358				
Less Adverse Water	-66	-66																
Total Peak Demand	5129	5188	5372	5445	5246	5325	5408	5472	5561	5651	5732	5813	5893	5973	5695	5773	5851	5928
Reserves	470	478	497	503	571	578	586	591	600	609	618	627	635	644	653	664	673	682
Total Peak Demand	**5599**	**5666**	**5870**	**5948**	**5817**	**5903**	**5993**	**6063**	**6161**	**6260**	**6350**	**6440**	**6528**	**6617**	**6347**	**6437**	**6525**	**6611**
System Surplus	**448**	**625**	**447**	**395**	**389**	**327**	**343**	**291**	**102**	**17**	**(65)**	**(146)**	**(226)**	**(305)**	**(413)**	**(519)**	**(606)**	**(692)**
Less : Brandon Unit 5	105	105	105	105	105	105	105	105										
Adverse Water	66	66																
Exportable Surplus	**277**	**454**	**342**	**290**	**284**	**222**	**238**	**186**	**102**	**17**								

No New Generation

System Firm Winter Peak Demand and Resources (MW)

2011 Base Load Forecast, 2011 DSM - Option 2

Kelsey Rerunnering, Pointe du Bois Rebuild 2030/31, Brandon Unit 5 until 2018/19, Wuskwatim 2011/12, Bipole III Line (West) 2017/18

Fiscal Year	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44	2044/45	2045/46	2046/47
Power Resources																		
Existing Manitoba Hydro Plants	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900
New Hydro																		
Wuskwatim	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Supply Side Enhancement Projects																		
Kelsey Rerunnering	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77
Pointe du Bois		43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Bipole III HVDC Line NET	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
Manitoba Thermal Plants																		
Brandon Unit 5																		
Selkirk Gas	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132
Brandon Units 6-7 SCGT	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280
Committed Wind																		
Demand Side Management	242	243	244	246	247	248	250	247	244	240	240	240	240	240	240	240	240	240
Contracted Imports																		
Total Power Resources	5920	5964	5965	5967	5968	5969	5971	5968	5965	5961	5961	5961	5961	5961	5961	5961	5961	5961
Peak Demand																		
2011 Base Load Forecast	6005	6081	6157	6233	6308	6384	6460	6536	6612	6688	6764	6840	6916	6992	7068	7144	7220	7296
Contracted Exports																		
Less Adverse Water																		
Total Peak Demand	6005	6081	6157	6233	6308	6384	6460	6536	6612	6688	6764	6840	6916	6992	7068	7144	7220	7296
Reserves	692	701	709	718	727	736	745	755	764	774	783	792	801	810	819	828	838	847
Total Peak Demand	**6696**	**6781**	**6866**	**6951**	**7036**	**7121**	**7206**	**7291**	**7376**	**7462**	**7547**	**7632**	**7717**	**7802**	**7887**	**7972**	**8057**	**8142**
System Surplus	**(777)**	**(817)**	**(901)**	**(984)**	**(1068)**	**(1151)**	**(1235)**	**(1323)**	**(1412)**	**(1501)**	**(1586)**	**(1671)**	**(1756)**	**(1841)**	**(1926)**	**(2011)**	**(2096)**	**(2181)**
Less : Brandon Unit 5																		
Adverse Water																		
Exportable Surplus																		

No New Generation

System Firm Energy Demand and Dependable Resources (GW.h)

2011 Base Load Forecast, 2011 DSM - Option 2

Kelsey Rerunnering, Pointe du Bois rebuild 2030/31, Wuskwatim 2011/12, Bipole III Line 2017/18 (West)

Fiscal Year	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
Power Resources																		
Existing Manitoba Hydro Plants	20740	20720	20700	20690	20680	20660	20640	20630	20610	20600	20590	20580	20580	20570	20560	20560	20550	20540
Hydro Adjustment	340	340	340	340	240	240	240	240	240	240	240	240	240	240				
Existing Hydro NET	21080	21060	21040	21030	20920	20900	20880	20870	20850	20840	20830	20820	20820	20810	20560	20560	20550	20540
New Hydro																		
Wuskwatim	75	1205	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
Supply Side Enhancement Projects																		
Kelsey Rerunnering																		
Pointe du Bois Rebuild																		
Bipole III HVDC Line NET							243	243	243	243	243	243	243	243	243	243	243	243
Manitoba Thermal Plants																		
Brandon Unit 5	811	811	811	811	811	811	811	811										
Selkirk Gas	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953
Brandon Units 6-7 SCGT	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354
Committed Wind	770	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819
Demand Side Management	183	293	411	508	608	696	699	774	830	882	911	944	971	996	1009	967	947	924
Imports																		
Contracted Energy Imports	2705	2705	2705	2705	1609	1614	1614	1614	1614	1614	1614	1614	1614	1614	267			
Non-Contracted Energy Imports					1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1446	1575	1575	1575
Total Power Resources	**28931**	**30200**	**30343**	**30430**	**30424**	**30497**	**30723**	**30788**	**30013**	**30056**	**30074**	**30097**	**30124**	**30139**	**28902**	**28721**	**28691**	**28658**
Demand																		
2011 Base Load Forecast	24615	25173	25930	26284	26406	26794	27205	27481	27966	28462	28887	29311	29733	30153	30570	30984	31396	31801
Non-Committed Construction Power															10	20	30	30
Current Exports	3584	3293	3156	3156	2115	2012	2012	2012	2012	2012	2012	2012	2012	2012	249	145	145	145
Less Adverse Water	-91	-91			-309	-370	-370	-370	-370	-370	-370	-370	-370	-370	-61			
Total Demand	**28108**	**28374**	**29086**	**29440**	**28213**	**28435**	**28846**	**29122**	**29607**	**30103**	**30529**	**30953**	**31375**	**31795**	**30768**	**31149**	**31571**	**31976**
System Surplus	**823**	**1826**	**1256**	**990**	**2212**	**2062**	**1877**	**1666**	**406**	**(48)**	**(454)**	**(856)**	**(1251)**	**(1656)**	**(1866)**	**(2427)**	**(2880)**	**(3317)**
Less: Brandon Unit 5	811	811	811	811	811	811	811	811										
Adverse Water Energy	91	91			309	370	370	370	370	370	370	370	370	370	61			
Exportable Surplus		**924**	**445**	**179**	**1092**	**881**	**695**	**485**	**36**									

No New Generation

System Firm Energy Demand and Dependable Resources (GW.h)

2011 Base Load Forecast, 2011 DSM - Option 2

Kelsey Rerunnering, Pointe du Bois rebuild 2030/31, Wuskwatim 2011/12, Bipole III Line 2017/18 (West)

Fiscal Year	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44	2044/45	2045/46	2046/47
Power Resources																		
Existing Manitoba Hydro Plants	20540	20530	20530	20520	20510	20510	20500	20490	20490	20480	20480	20470	20460	20460	20450	20440	20440	20430
Hydro Adjustment																		
Existing Hydro NET	20540	20530	20530	20520	20510	20510	20500	20490	20490	20480	20480	20470	20460	20460	20450	20440	20440	20430
New Hydro																		
Wuskwatim	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
Supply Side Enhancement Projects																		
Kelsey Rerunnering																		
Pointe du Bois Rebuild		60	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
Bipole III HVDC Line NET	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243
Manitoba Thermal Plants																		
Brandon Unit 5																		
Selkirk Gas	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953
Brandon Units 6-7 SCGT	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354
Committed Wind	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819
Demand Side Management	911	894	889	889	888	885	887	878	868	858	858	858	858	858	858	858	858	858
Imports																		
Contracted Energy Imports																		
Non-Contracted Energy Imports	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Total Power Resources	**28645**	**28678**	**28764**	**28753**	**28742**	**28739**	**28732**	**28713**	**28703**	**28682**	**28682**	**28672**	**28662**	**28662**	**28652**	**28642**	**28642**	**28632**
Demand																		
2011 Base Load Forecast	32208	32608	33009	33409	33809	34209	34610	35010	35410	35811	36211	36611	37012	37412	37812	38213	38613	39013
Non-Committed Construction Power	35	30	10															
Current Exports	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145
Less Adverse Water																		
Total Demand	**32388**	**32783**	**33164**	**33554**	**33954**	**34354**	**34755**	**35155**	**35555**	**35956**	**36356**	**36756**	**37157**	**37557**	**37957**	**38358**	**38758**	**39158**
System Surplus	**(3743)**	**(4105)**	**(4400)**	**(4800)**	**(5212)**	**(5615)**	**(6023)**	**(6443)**	**(6853)**	**(7274)**	**(7674)**	**(8084)**	**(8495)**	**(8895)**	**(9305)**	**(9716)**	**(10116)**	**(10526)**
Less: Brandon Unit 5																		
Adverse Water Energy																		
Exportable Surplus																		

Recommended Plan

System Firm Winter Peak Demand and Resources (MW)

2011 Base Load Forecast, 2011 DSM - Option 2

Kelsey Rerunnering, Pointe du Bois rebuild 2030/31, Brandon Unit 5 until 2018/19, Wuskwatim 2011/12, Bipole III Line (West) 2017/18
Supply Includes: Keeyask 2019/20, Conawapa 2024/25, SCGT's starting in 2033/34, 500kV interconnection in 2019/20
Demand Includes: Potential Sales to Wisconsin Public Service and Minnesota Power

Fiscal Year	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
Power Resources																		
Existing Manitoba Hydro Plants	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900
New Hydro																		
Wuskwatim		200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Conawapa														520	1040	1300	1300	1300
Keeyask									90	450	630	630	630	630	630	630	630	630
Supply Side Enhancement Projects																		
Kelsey Rerunnering (Net)	55	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77
Pointe du Bois																		
Bipole III HVDC Line NET							89	89	89	79	79	79	79	79	10	10	10	10
Manitoba Thermal Plants																		
Brandon Unit 5	105	105	105	105	105	105	105	105										
Selkirk Gas	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132
Brandon Units 6-7 SCGT	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280
New Thermal Plants																		
SCGT																		
Committed Wind																		
New Wind																		
Demand Side Management	25	47	72	99	127	150	169	186	200	214	222	231	240	249	256	241	241	241
Contracted Imports	550	550	550	550	385	385	385	385	385	385	385	385	385	385				
Total Power Resources	6047	6291	6316	6343	6206	6229	6337	6354	6353	6717	6905	6914	6923	7452	7525	7770	7770	7770
Peak Demand																		
2011 Base Load Forecast	4557	4649	4767	4840	4888	4967	5050	5115	5203	5293	5374	5455	5535	5615	5695	5773	5851	5928
Contracted Exports	638	605	605	605	358	358	358	358	358	633	743	743	743	743	385	385	275	275
Proposed Exports															440	440	550	550
Less Adverse Water	-66	-66																
Total Peak Demand	5129	5188	5372	5445	5246	5325	5408	5472	5561	5926	6117	6198	6278	6358	6520	6598	6676	6753
Reserves	470	478	497	503	571	578	586	591	600	609	618	627	635	644	653	664	673	682
Total Peak Demand	**5599**	**5666**	**5870**	**5948**	**5817**	**5903**	**5993**	**6063**	**6161**	**6535**	**6735**	**6825**	**6913**	**7002**	**7172**	**7262**	**7350**	**7436**
System Surplus	**448**	**625**	**447**	**395**	**389**	**327**	**343**	**291**	**192**	**182**	**170**	**89**	**9**	**450**	**353**	**507**	**420**	**334**
Less : Brandon Unit 5	105	105	105	105	105	105	105	105										
Adverse Water	66	66																
Exportable Surplus	**277**	**454**	**342**	**290**	**284**	**222**	**238**	**186**	**192**	**182**	**170**	**89**	**9**	**450**	**353**	**507**	**420**	**334**

Recommended Plan

System Firm Winter Peak Demand and Resources (MW)

2011 Base Load Forecast, 2011 DSM - Option 2

Kelsey Rerunnering, Pointe du Bois rebuild 2030/31, Brandon Unit 5 until 2018/19, Wuskwatim 2011/12, Bipole III Line (West) 2017/18
Supply Includes: Keeyask 2019/20, Conawapa 2024/25, SCGT's starting in 2033/34, 500kV interconnection in 2019/20
Demand Includes: Potential Sales to Wisconsin Public Service and Minnesota Power

Fiscal Year	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44	2044/45	2045/46	2046/47
Power Resources																		
Existing Manitoba Hydro Plants	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900
New Hydro																		
Wuskwatim	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Conawapa	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
Keeyask	630	630	630	630	630	630	630	630	630	630	630	630	630	630	630	630	630	630
Supply Side Enhancement Projects																		
Kelsey Rerunnering	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77
Pointe du Bois		43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Bipole III HVDC Line NET	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Manitoba Thermal Plants																		
Brandon Unit 5																		
Selkirk Gas	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132
Brandon Units 6-7 SCGT	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280
New Thermal Plants																		
SCGT					58	174	174	174	174	174	174	174	174	174	174	232	290	348
Committed Wind																		
New Wind																		
Demand Side Management	242	243	244	246	247	248	250	247	244	240	240	240	240	240	240	240	240	240
Contracted Imports																		
Total Power Resources	7771	7815	7816	7818	7877	7994	7996	7993	7990	7986	7986	7986	7986	7986	7986	8044	8102	8160
Peak Demand																		
2011 Base Load Forecast	6005	6081	6157	6233	6308	6384	6460	6536	6612	6688	6764	6840	6916	6992	7068	7144	7220	7296
Contracted Exports	275	275	275	275	275	275												
Proposed Exports	550	550	550	550	550	550	550	440	330	165								
Less Adverse Water																		
Total Peak Demand	6830	6906	6982	7058	7133	7209	7010	6976	6942	6853	6764	6840	6916	6992	7068	7144	7220	7296
Reserves	692	701	709	718	727	736	745	755	764	774	783	792	801	810	819	828	838	847
Total Peak Demand	7521	7606	7691	7776	7861	7946	7756	7731	7706	7627	7547	7632	7717	7802	7887	7972	8057	8142
System Surplus	**249**	**209**	**125**	**42**	**16**	**49**	**240**	**262**	**283**	**359**	**439**	**354**	**269**	**184**	**99**	**72**	**45**	**18**
Less : Brandon Unit 5																		
Adverse Water																		
Exportable Surplus	**249**	**209**	**125**	**42**	**16**	**49**	**240**	**262**	**283**	**359**	**439**	**354**	**269**	**184**	**99**	**72**	**45**	**18**

Recommended Plan

System Firm Energy Demand and Dependable Resources (GW.h)

2011 Base Load Forecast, 2011 DSM - Option 2

Kelsey Rerunnering, Pointe du Bois rebuild 2030/31, Brandon Unit 5 until 2018/19, Wuskwatim 2011/12, Bipole III Line (West) 2017/18
Supply Includes: Keeyask 2019/20, Conawapa 2024/25, SCGT's starting in 2041/42, 500kV interconnection in 2019/20
Demand Includes: Potential Sales to Wisconsin Public Service and Minnesota Power

Fiscal Year	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
Power Resources																		
Existing Manitoba Hydro Plants	20740	20720	20700	20690	20680	20660	20640	20630	20610	20600	20590	20580	20580	20570	20560	20560	20550	20540
Hydro Adjustment	340	340	340	340	240	240	240	240	240	240	240	240	240	240				
Existing Hydro NET	21080	21060	21040	21030	20920	20900	20880	20870	20850	20840	20830	20820	20820	20810	20560	20560	20550	20540
New Hydro																		
Wuskwatim	75	1205	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
Conawapa														2151	4550	4550	4550	4550
Keeyask									677	2898	2903	2903	2903	2903	2903	2903	2903	2903
Supply Side Enhancement Projects																		
Kelsey Rerunnering																		
Pointe du Bois Rebuild																		
Bipole III HVDC Line NET							243	243	243	258	258	258	258	258	162	162	162	162
Manitoba Thermal Plants																		
Brandon Unit 5	811	811	811	811	811	811	811	811										
Selkirk Gas	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953
Brandon Units 6-7 SCGT	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354
New Thermal Plants																		
SCGT																		
Committed Wind	770	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819
New Wind																		
Demand Side Management	183	293	411	508	608	696	699	774	830	882	911	944	971	996	1009	967	947	924
Imports																		
Contracted Energy Imports	2705	2705	2705	2705	1609	1614	1614	1614	1614	2527	2710	2710	2710	2710	1363	1096	1096	1096
Proposed Energy Imports															1460	1753	2118	2192
Non-Contracted Energy Imports					1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1446	1575	1575	1575
Total Power Resources	**28931**	**30200**	**30343**	**30430**	**30424**	**30497**	**30723**	**30788**	**30690**	**33881**	**34088**	**34111**	**34138**	**36304**	**38830**	**38942**	**39277**	**39318**
Demand																		
2011 Base Load Forecast	24615	25173	25930	26284	26406	26794	27205	27481	27966	28462	28887	29311	29733	30153	30570	30984	31396	31801
Non-Committed Construction Power			10	25	50	60	85	105	80	75	55	80	100	90	40	25	30	30
Exports																		
Current Exports	3584	3293	3156	3156	2115	2012	2012	2012	2012	3064	3695	3780	3780	3780	2017	1913	1492	1408
Proposed Exports															1683	2020	2441	2525
Less Adverse Water	-91	-91			-309	-370	-370	-370	-370	-370	-370	-370	-370	-370	-61			
Total Demand	**28108**	**28374**	**29096**	**29465**	**28263**	**28495**	**28931**	**29227**	**29687**	**31230**	**32267**	**32801**	**33242**	**33653**	**34249**	**34942**	**35359**	**35764**
System Surplus	**823**	**1826**	**1246**	**965**	**2162**	**2002**	**1792**	**1561**	**1003**	**2651**	**1821**	**1310**	**895**	**2651**	**4581**	**4000**	**3918**	**3554**
Less: Brandon Unit 5	811	811	811	811	811	811	811	811										
Adverse Water Energy	91	91			309	370	370	370	370	370	370	370	370	370	61			
Exportable Surplus		**924**	**435**	**154**	**1042**	**821**	**610**	**380**	**633**	**2281**	**1451**	**939**	**525**	**2280**	**4520**	**4000**	**3918**	**3554**

Recommended Plan

System Firm Energy Demand and Dependable Resources (GW.h)

2011 Base Load Forecast, 2011 DSM - Option 2

Kelsey Rerunnering, Pointe du Bois rebuild 2030/31, Brandon Unit 5 until 2018/19, Wuskwatim 2011/12, Bipole III Line (West) 2017/18
Supply Includes: Keeyask 2019/20, Conawapa 2024/25, SCGT's starting in 2041/42, 500 kV interconnection in 2019/20
Demand Includes: Potential Sales to Wisconsin Public Service and Minnesota Power

Fiscal Year	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44	2044/45	2045/46	2046/47
Power Resources																		
Existing Manitoba Hydro Plants	20540	20530	20530	20520	20510	20510	20500	20490	20490	20480	20480	20470	20460	20460	20450	20440	20440	20430
Hydro Adjustment																		
Existing Hydro NET	20540	20530	20530	20520	20510	20510	20500	20490	20490	20480	20480	20470	20460	20460	20450	20440	20440	20430
New Hydro																		
Wuskwatim	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
Conawapa	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550
Keeyask	2903	2903	2903	2903	2903	2903	2903	2903	2903	2903	2903	2903	2903	2903	2903	2903	2903	2903
Supply Side Enhancement Projects																		
Kelsey Rerunnering																		
Pointe du Bois Rebuild		60	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
Bipole III HVDC Line NET	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Manitoba Thermal Plants																		
Brandon Unit 5																		
Selkirk Gas	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953
Brandon Units 6-7 SCGT	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354
New Thermal Plants																		
SCGT													481	962	1443	1924	2405	2405
Committed Wind	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819
New Wind																		
Demand Side Management	911	894	889	889	888	885	887	878	868	858	858	858	858	858	858	858	858	858
Imports																		
Contracted Energy Imports	1096	1096	1096	1096	1096	1096	183											
WPS 500 Proposed Energy Imports	2192	2192	2192	2192	2192	2192	2192	1826	1388	767	110							
Non-Contracted Energy Imports	1575	1575	1575	1575	1575	1575	1575	1575	1575	1594	2214	2342	2342	2342	2342	2342	2342	2342
Total Power Resources	**39304**	**39337**	**39423**	**39413**	**39401**	**39399**	**38478**	**37911**	**37463**	**36840**	**36803**	**36811**	**37282**	**37763**	**38234**	**38705**	**39186**	**39176**
Demand																		
2011 Base Load Forecast	32208	32608	33009	33409	33809	34209	34610	35010	35410	35811	36211	36611	37012	37412	37812	38213	38613	39013
Non-Committed Construction Power	35	30	10															
Exports																		
Current Exports	1408	1408	1408	1408	1408	1408	356	145	145	145	145	145	145	145	145	145	145	145
WPS Proposed Exports	2525	2525	2525	2525	2525	2525	2525	2105	1600	884	127							
Less Adverse Water																		
Total Demand	**36176**	**36571**	**36952**	**37342**	**37742**	**38143**	**37491**	**37260**	**37155**	**36840**	**36483**	**36756**	**37157**	**37557**	**37957**	**38358**	**38758**	**39158**
System Surplus	**3128**	**2766**	**2471**	**2071**	**1659**	**1256**	**987**	**651**	**308**	**0**	**320**	**55**	**125**	**206**	**277**	**347**	**428**	**18**
Less: Brandon Unit 5																		
Adverse Water Energy																		
Exportable Surplus	**3128**	**2766**	**2471**	**2071**	**1659**	**1256**	**987**	**651**	**308**	**0**	**320**	**55**	**125**	**206**	**277**	**347**	**428**	**18**

Alternative Development Plan 1 250 MW Interconnection

System Firm Winter Peak Demand and Resources (MW)

2011 Base Load Forecast, 2011 DSM - Option 2

Kelsey Rerunnering, Pointe du Bois rebuild 2030/31, Brandon Unit 5 until 2018/19, Wuskwatim 2011/12, Bipole III Line 2017/18 (West)
Supply Includes: Keeyask 2019/20, Conawapa 2024/25, SCGT's starting 2041/42, 250 MW interconnection in 2020/21
Demand Includes: Potential 100 MW Wisconsin Public Service Sale and 250 MW Minnesota Power Sale

Fiscal Year	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
Power Resources																		
Existing Manitoba Hydro Plants	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900
New Hydro																		
Wuskwatim		200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Conawapa														520	1040	1300	1300	1300
Keeyask									90	450	630	630	630	630	630	630	630	630
Supply Side Enhancement Projects																		
Kelsey Rerunnering (Net)	55	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77
Pointe du Bois																		
Bipole III HVDC Line NET							89	89	89	79	79	79	79	79	10	10	10	10
Manitoba Thermal Plants																		
Brandon Unit 5	105	105	105	105	105	105	105	105										
Selkirk Gas	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132
Brandon Units 6-7 SCGT	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280
New Thermal Plants																		
SCGT																		
Committed Wind																		
New Wind																		
Demand Side Management	25	47	72	99	127	150	169	186	200	214	222	231	240	249	256	241	241	241
Contracted Imports	550	550	550	550	385	385	385	385	385	385	385	385	385	385				
Total Power Resources	6047	6291	6316	6343	6206	6229	6337	6354	6353	6717	6905	6914	6923	7452	7525	7770	7770	7770
Peak Demand																		
2011 Base Load Forecast	4557	4649	4767	4840	4888	4967	5050	5115	5203	5293	5374	5455	5535	5615	5695	5773	5851	5928
Contracted Exports	638	605	605	605	358	358	358	358	358	633	743	743	743	743	385	385	275	275
Proposed Exports																		
Less Adverse Water	-66	-66																
Total Peak Demand	5129	5188	5372	5445	5246	5325	5408	5472	5561	5926	6117	6198	6278	6358	6080	6158	6126	6203
Reserves	470	478	497	503	571	578	586	591	600	609	618	627	635	644	653	664	673	682
Total Peak Demand	**5599**	**5666**	**5870**	**5948**	**5817**	**5903**	**5993**	**6063**	**6161**	**6535**	**6735**	**6825**	**6913**	**7002**	**6732**	**6822**	**6800**	**6886**
System Surplus	**448**	**625**	**447**	**395**	**389**	**327**	**343**	**291**	**192**	**182**	**170**	**89**	**9**	**450**	**793**	**947**	**970**	**884**
Less : Brandon Unit 5	105	105	105	105	105	105	105	105										
Adverse Water	66	66																
Exportable Surplus	**277**	**454**	**342**	**290**	**284**	**222**	**238**	**186**	**192**	**182**	**170**	**89**	**9**	**450**	**793**	**947**	**970**	**884**

System Firm Winter Peak Demand and Resources (MW)

2011 Base Load Forecast, 2011 DSM - Option 2

Kelsey Rerunnering, Pointe du Bois rebuild 2030/31, Brandon Unit 5 until 2018/19, Wuskwatim 2011/12, Bipole III Line 2017/18 (West)
Supply Includes: Keeyask 2019/20, Conawapa 2024/25, SCGT's starting 2041/42, 250 MW interconnection in 2020/21
Demand Includes: Potential 100 MW Wisconsin Public Service Sale and 250 MW Minnesota Power Sale

Fiscal Year	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44	2044/45	2045/46	2046/47
Power Resources																		
Existing Manitoba Hydro Plants	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900
New Hydro																		
Wuskwatim	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Conawapa	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
Keeyask	630	630	630	630	630	630	630	630	630	630	630	630	630	630	630	630	630	630
Supply Side Enhancement Projects																		
Kelsey Rerunnering	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77
Pointe du Bois		43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Bipole III HVDC Line NET	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Manitoba Thermal Plants																		
Brandon Unit 5																		
Selkirk Gas	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132
Brandon Units 6-7 SCGT	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280
New Thermal Plants																		
SCGT													58	116	174	232	290	348
Committed Wind																		
New Wind																		
Demand Side Management	242	243	244	246	247	248	250	247	244	240	240	240	240	240	240	240	240	240
Contracted Imports																		
Total Power Resources	7771	7815	7816	7818	7819	7820	7822	7819	7816	7812	7812	7812	7870	7928	7986	8044	8102	8160
Peak Demand																		
2011 Base Load Forecast	6005	6081	6157	6233	6308	6384	6460	6536	6612	6688	6764	6840	6916	6992	7068	7144	7220	7296
Contracted Exports	275	275	275	275	275	275												
Proposed Exports																		
Less Adverse Water																		
Total Peak Demand	6280	6356	6432	6508	6583	6659	6460	6536	6612	6688	6764	6840	6916	6992	7068	7144	7220	7296
Reserves	692	701	709	718	727	736	745	755	764	774	783	792	801	810	819	828	838	847
Total Peak Demand	6971	7056	7141	7226	7311	7396	7206	7291	7376	7462	7547	7632	7717	7802	7887	7972	8057	8142
System Surplus	**799**	**759**	**675**	**592**	**508**	**425**	**616**	**528**	**439**	**350**	**265**	**180**	**153**	**126**	**99**	**72**	**45**	**18**
Less : Brandon Unit 5																		
Adverse Water																		
Exportable Surplus	**799**	**759**	**675**	**592**	**508**	**425**	**616**	**528**	**439**	**350**	**265**	**180**	**153**	**126**	**99**	**72**	**45**	**18**

Alternative Development Plan 1 250 MW Interconnection

System Firm Energy Demand and Dependable Resources (GWh)

2011 Base Load Forecast, 2011 DSM - Option 2

Kelsey Rerunnering, Pointe du Bois rebuild 2030/31, Brandon Unit 5 until 2018/19, Wuskwatim 2011/12, Bipole III Line 2017/18 (West)
Supply Includes: Keeyask 2019/20, Conawapa 2024/25, SCGT's starting 2041/42, 250 MW interconnection in 2020/21
Demand Includes: Potential 100 MW Wisconsin Public Service Sale and 250 MW Minnesota Power Sale

Fiscal Year	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
Power Resources																		
Existing Manitoba Hydro Plants	20740	20720	20700	20690	20680	20660	20640	20630	20610	20600	20590	20580	20580	20570	20560	20560	20550	20540
Hydro Adjustment	340	340	340	340	240	240	240	240	240	240	240	240	240	240				
Existing Hydro NET	21080	21060	21040	21030	20920	20900	20880	20870	20850	20840	20830	20820	20820	20810	20560	20560	20550	20540
New Hydro																		
Wuskwatim	75	1205	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
Conawapa														2151	4550	4550	4550	4550
Keeyask									677	2898	2903	2903	2903	2903	2903	2903	2903	2903
Supply Side Enhancement Projects																		
Kelsey Rerunnering																		
Pointe du Bois Rebuild																		
Bipole III HVDC Line NET							243	243	243	258	258	258	258	258	162	162	162	162
Manitoba Thermal Plants																		
Brandon Unit 5	811	811	811	811	811	811	811	811										
Selkirk Gas	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953
Brandon Units 6-7 SCGT	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354
New Thermal Plants																		
SCGT																		
Committed Wind	770	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819
New Wind																		
Demand Side Management	183	293	411	508	608	696	699	774	830	882	911	944	971	996	1009	967	947	924
Imports																		
Contracted Energy Imports	2705	2705	2705	2705	1609	1614	1614	1614	1614	2527	2710	2710	2710	2710	1363	1096	1096	1096
Proposed Energy Imports																		
Non-Contracted Energy Imports					1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1446	1575	1575	1575
Total Power Resources	**28931**	**30200**	**30343**	**30430**	**30424**	**30497**	**30723**	**30788**	**30690**	**33881**	**34088**	**34111**	**34138**	**36304**	**37370**	**37189**	**37159**	**37126**
Demand																		
2011 Base Load Forecast	24615	25173	25930	26284	26406	26794	27205	27481	27966	28462	28887	29311	29733	30153	30570	30984	31396	31801
Non-Committed Construction Power			10	25	50	60	85	105	80	75	55	80	100	90	40	25	30	30
Exports																		
Current Exports	3584	3293	3156	3156	2115	2012	2012	2012	2012	3064	3695	3780	3780	3780	2017	1913	1492	1408
Proposed Exports																		
Less Adverse Water	-91	-91			-309	-370	-370	-370	-370	-370	-370	-370	-370	-370	-61			
Total Demand	**28108**	**28374**	**29096**	**29465**	**28263**	**28495**	**28931**	**29227**	**29687**	**31230**	**32267**	**32801**	**33242**	**33653**	**32566**	**32922**	**32918**	**33238**
System Surplus	**823**	**1826**	**1246**	**965**	**2162**	**2002**	**1792**	**1561**	**1003**	**2651**	**1821**	**1310**	**895**	**2651**	**4804**	**4268**	**4241**	**3888**
Less: Brandon Unit 5	811	811	811	811	811	811	811	811										
Adverse Water Energy	91	91			309	370	370	370	370	370	370	370	370	370	61			
Exportable Surplus		**924**	**435**	**154**	**1042**	**821**	**610**	**380**	**633**	**2281**	**1451**	**939**	**525**	**2280**	**4743**	**4268**	**4241**	**3888**

System Firm Energy Demand and Dependable Resources (GWh)

2011 Base Load Forecast, 2011 DSM - Option 2

Kelsey Rerunnering, Pointe du Bois rebuild 2030/31, Brandon Unit 5 until 2018/19, Wuskwatim 2011/12, Bipole III Line 2017/18 (West)
Supply Includes: Keeyask 2019/20, Conawapa 2024/25, SCGT's starting 2041/42, 250 MW interconnection in 2020/21
Demand Includes: Potential 100 MW Wisconsin Public Service Sale and 250 MW Minnesota Power Sale

Fiscal Year	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44	2044/45	2045/46	2046/47
Power Resources																		
Existing Manitoba Hydro Plants	20540	20530	20530	20520	20510	20510	20500	20490	20490	20480	20480	20470	20460	20460	20450	20440	20440	20430
Hydro Adjustment																		
Existing Hydro NET	20540	20530	20530	20520	20510	20510	20500	20490	20490	20480	20480	20470	20460	20460	20450	20440	20440	20430
New Hydro																		
Wuskwatim	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
Conawapa	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550
Keeyask	2903	2903	2903	2903	2903	2903	2903	2903	2903	2903	2903	2903	2903	2903	2903	2903	2903	2903
Supply Side Enhancement Projects																		
Kelsey Rerunnering																		
Pointe du Bois Rebuild		60	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
Bipole III HVDC Line NET	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Manitoba Thermal Plants																		
Brandon Unit 5																		
Selkirk Gas	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953
Brandon Units 6-7 SCGT	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354
New Thermal Plants																		
SCGT													481	962	1443	1924	2405	2405
Committed Wind	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819
New Wind																		
Demand Side Management	911	894	889	889	888	885	887	878	868	858	858	858	858	858	858	858	858	858
Imports																		
Contracted Energy Imports	1096	1096	1096	1096	1096	1096	183											
Proposed Energy Imports																		
Non-Contracted Energy Imports	1575	1575	1575	1575	1575	1575	2214	2342	2342	2342	2342	2342	2342	2342	2342	2342	2342	2342
Total Power Resources	**37113**	**37146**	**37231**	**37221**	**37210**	**37207**	**36925**	**36851**	**36842**	**36821**	**36821**	**36811**	**37282**	**37763**	**38234**	**38705**	**39186**	**39176**
Demand																		
2011 Base Load Forecast	32208	32608	33009	33409	33809	34209	34610	35010	35410	35811	36211	36611	37012	37412	37812	38213	38613	39013
Non-Committed Construction Power	35	30	10															
Exports																		
Current Exports	1408	1408	1408	1408	1408	1408	356	145	145	145	145	145	145	145	145	145	145	145
Proposed Exports																		
Less Adverse Water																		
Total Demand	**33651**	**34046**	**34426**	**34817**	**35217**	**35617**	**34966**	**35155**	**35555**	**35956**	**36356**	**36756**	**37157**	**37557**	**37957**	**38358**	**38758**	**39158**
System Surplus	**3462**	**3100**	**2805**	**2405**	**1993**	**1590**	**1960**	**1696**	**1286**	**865**	**465**	**55**	**125**	**206**	**277**	**347**	**428**	**18**
Less: Brandon Unit 5																		
Adverse Water Energy																		
Exportable Surplus	**3462**	**3100**	**2805**	**2405**	**1993**	**1590**	**1960**	**1696**	**1286**	**865**	**465**	**55**	**125**	**206**	**277**	**347**	**428**	**18**

Alternative Development Plan 2 No New interconnection

System Firm Winter Peak Demand and Resources (MW)

2011 Base Load Forecast, 2011 DSM - Option 2

Kelsey Rerunnering, Pointe du Bois Rebuild 2030/31, Brandon Unit 5 until 2018/19, Wuskwatim 2011/12, Bipole III Line (West) 2017/18
Supply Includes Conawapa 2027/28, CCGT's starting in 2021/22, SCGT's starting in 2025/26 as required

Fiscal Year	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
Power Resources																		
Existing Manitoba Hydro Plants	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900
New Hydro																		
Wuskwatim		200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Conawapa																	520	1040
Keeyask																		
Supply Side Enhancement Projects																		
Kelsey Rerunnering (Net)	55	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77
Pointe du Bois																		
Bipole III HVDC Line NET							89	89	89	89	89	89	89	89	89	89	89	48
Manitoba Thermal Plants																		
Brandon Unit 5	105	105	105	105	105	105	105	105										
Selkirk Gas	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132
Brandon Units 6-7 SCGT	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280
New Thermal Plants																		
SCGT															58	174	174	174
CCGT											357	357	357	357	357	357	357	357
Committed Wind																		
New Wind																		
Demand Side Management	25	47	72	99	127	150	169	186	200	214	222	231	240	249	256	241	241	241
Contracted Imports	550	550	550	550	385	385	385	385	385	385	385	385	385	385				
Total Power Resources	6047	6291	6316	6343	6206	6229	6337	6354	6263	6277	6642	6651	6660	6669	6349	6450	6970	7449
Peak Demand																		
2011 Base Load Forecast	4557	4649	4767	4840	4888	4967	5050	5115	5203	5293	5374	5455	5535	5615	5695	5773	5851	5928
Contracted Exports	638	605	605	605	358	358	358	358	358	358	358	358	358	358				
Proposed Exports																		
Less Adverse Water	-66	-66																
Total Peak Demand	5129	5188	5372	5445	5246	5325	5408	5472	5561	5651	5732	5813	5893	5973	5695	5773	5851	5928
Reserves	470	478	497	503	571	578	586	591	600	609	618	627	635	644	653	664	673	682
Total Peak Demand	**5599**	**5666**	**5870**	**5948**	**5817**	**5903**	**5993**	**6063**	**6161**	**6260**	**6350**	**6440**	**6528**	**6617**	**6347**	**6437**	**6525**	**6611**
System Surplus	**448**	**625**	**447**	**395**	**389**	**327**	**343**	**291**	**102**	**17**	**292**	**211**	**131**	**52**	**2**	**12**	**445**	**838**
Less : Brandon Unit 5	105	105	105	105	105	105	105	105										
Adverse Water	66	66																
Exportable Surplus	**277**	**454**	**342**	**290**	**284**	**222**	**238**	**186**	**102**	**17**	**292**	**211**	**131**	**52**	**2**	**12**	**445**	**838**

Alternative Development Plan 2 No New interconnection Page 2 of 2

System Firm Winter Peak Demand and Resources (MW)

2011 Base Load Forecast, 2011 DSM - Option 2

Kelsey Rerunnering, Pointe du Bois Rebuild 2030/31, Brandon Unit 5 until 2018/19, Wuskwatim 2011/12, Bipole III Line (West) 2017/18
Supply Includes Conawapa 2027/28, CCGT's starting in 2021/22, SCGT's starting in 2025/26 as required

Fiscal Year	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44	2044/45	2045/46	2046/47
Power Resources																		
Existing Manitoba Hydro Plants	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900	4900
New Hydro																		
Wuskwatim	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Conawapa	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
Keeyask																		
Supply Side Enhancement Projects																		
Kelsey Rerunnering	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77
Pointe du Bois		43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Bipole III HVDC Line NET	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Manitoba Thermal Plants																		
Brandon Unit 5																		
Selkirk Gas	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132
Brandon Units 6-7 SCGT	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280
New Thermal Plants																		
SCGT	174	174	174	174	174	174	174	174	174	174	174	174	174	232	348	406	522	580
CCGT 310	357	357	357	357	357	357	357	357	357	357	357	357	357	357	357	357	357	357
Committed Wind																		
New Wind																		
Demand Side Management	242	243	244	246	247	248	250	247	244	240	240	240	240	240	240	240	240	240
Contracted Imports																		
Total Power Resources	7710	7754	7755	7757	7758	7759	7761	7758	7755	7751	7751	7751	7751	7809	7925	7983	8099	8157
Peak Demand																		
2011 Base Load Forecast	6005	6081	6157	6233	6308	6384	6460	6536	6612	6688	6764	6840	6916	6992	7068	7144	7220	7296
Contracted Exports																		
Proposed Exports																		
Less Adverse Water																		
Total Peak Demand	6005	6081	6157	6233	6308	6384	6460	6536	6612	6688	6764	6840	6916	6992	7068	7144	7220	7296
Reserves	692	701	709	718	727	736	745	755	764	774	783	792	801	810	819	828	838	847
Total Peak Demand	6696	6781	6866	6951	7036	7121	7206	7291	7376	7462	7547	7632	7717	7802	7887	7972	8057	8142
System Surplus	**1013**	**973**	**889**	**806**	**722**	**639**	**555**	**467**	**378**	**289**	**204**	**119**	**34**	**7**	**38**	**11**	**42**	**15**
Less : Brandon Unit 5																		
Adverse Water																		
Exportable Surplus	**1013**	**973**	**889**	**806**	**722**	**639**	**555**	**467**	**378**	**289**	**204**	**119**	**34**	**7**	**38**	**11**	**42**	**15**

Alternative Development Plan 2 No New interconnection

System Firm Energy Demand and Dependable Resources (GW.h)

2011 Base Load Forecast, 2011 DSM - Option 2

Kelsey Rerunnering, Pointe du Bois rebuild 2030/31, Wuskwatim 2011/12, Bipole III Line 2017/18 (West)
Supply Includes Conawapa 2027/28, CCGT's starting in 2021/22, SCGT's starting in 2025/26 as required

Fiscal Year	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
Power Resources																		
Existing Manitoba Hydro Plants	20740	20720	20700	20690	20680	20660	20640	20630	20610	20600	20590	20580	20580	20570	20560	20560	20550	20540
Hydro Adjustment	340	340	340	340	240	240	240	240	240	240	240	240	240	240				
Existing Hydro NET	21080	21060	21040	21030	20920	20900	20880	20870	20850	20840	20830	20820	20820	20810	20560	20560	20550	20540
New Hydro																		
Wuskwatim	75	1205	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
Conawapa																	2151	4550
Keeyask																		
Supply Side Enhancement Projects																		
Kelsey Rerunnering																		
Pointe du Bois Rebuild																		
Bipole III HVDC Line NET							243	243	243	243	243	243	243	243	243	243	243	228
Manitoba Thermal Plants																		
Brandon Unit 5	811	811	811	811	811	811	811	811										
Selkirk Gas	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953
Brandon Units 6-7 SCGT	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354
New Thermal Plants																		
SCGT																		
CCGT											2900	2900	2900	2900	2900	2900	2900	2900
Committed Wind	770	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819
New Wind																		
Demand Side Management	183	293	411	508	608	696	699	774	830	882	911	944	971	996	1009	967	947	924
Imports																		
Contracted Energy Imports	2705	2705	2705	2705	1609	1614	1614	1614	1614	1614	1614	1614	1614	1614	267			
Proposed Energy Imports																		
Non-Contracted Energy Imports					1100	1100	1100	1100	1100	1163	1100	1100	1100	1100	1446	1575	1575	1575
Total Power Resources	**28931**	**30200**	**30343**	**30430**	**30424**	**30497**	**30723**	**30788**	**30013**	**30119**	**32974**	**32997**	**33024**	**33039**	**31802**	**31621**	**33742**	**36093**
Demand																		
2011 Base Load Forecast	24615	25173	25930	26284	26406	26794	27205	27481	27966	28462	28887	29311	29733	30153	30570	30984	31396	31801
Non-Committed Construction Power									10	15	20	30	50	55	90	120	120	60
Exports																		
Current Exports	3584	3293	3156	3156	2115	2012	2012	2012	2012	2012	2012	2012	2012	2012	249	145	145	145
Proposed Exports																		
Less Adverse Water	-91	-91			-309	-370	-370	-370	-370	-370	-370	-370	-370	-370	-61			
Total Demand	**28108**	**28374**	**29086**	**29440**	**28213**	**28435**	**28846**	**29122**	**29617**	**30118**	**30549**	**30983**	**31425**	**31850**	**30848**	**31249**	**31661**	**32006**
System Surplus	**823**	**1826**	**1256**	**990**	**2212**	**2062**	**1877**	**1666**	**396**	**0**	**2426**	**2014**	**1599**	**1189**	**954**	**373**	**2081**	**4088**
Less: Brandon Unit 5	811	811	811	811	811	811	811	811										
Adverse Water Energy	91	91			309	370	370	370	370	370	370	370	370	370	61			
Exportable Surplus		**924**	**445**	**179**	**1092**	**881**	**695**	**485**	**26**		**2055**	**1643**	**1229**	**819**	**893**	**373**	**2081**	**4088**

Alternative Development Plan 2 No New interconnection

System Firm Energy Demand and Dependable Resources (GW.h)

2011 Base Load Forecast, 2011 DSM - Option 2

Kelsey Rerunnering, Pointe du Bois rebuild 2030/31, Wuskwatim 2011/12, Bipole III Line 2017/18 (West)
Supply Includes Conawapa 2027/28, CCGT's starting in 2021/22, SCGT's starting in 2025/26 as required

Fiscal Year	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44	2044/45	2045/46	2046/47
Power Resources																		
Existing Manitoba Hydro Plants	20540	20530	20530	20520	20510	20510	20500	20490	20490	20480	20480	20470	20460	20460	20450	20440	20440	20430
Hydro Adjustment																		
Existing Hydro NET	20540	20530	20530	20520	20510	20510	20500	20490	20490	20480	20480	20470	20460	20460	20450	20440	20440	20430
New Hydro																		
Wuskwatim	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
Conawapa	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550	4550
Keeyask																		
Supply Side Enhancement Projects																		
Kelsey Rerunnering																		
Pointe du Bois Rebuild		60	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
Bipole III HVDC Line NET	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228
Manitoba Thermal Plants																		
Brandon Unit 5																		
Selkirk Gas	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953	953
Brandon Units 6-7 SCGT	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354	2354
New Thermal Plants																		
SCGT											481	962	1443	1924	1924	2405	2886	3367
CCGT	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900
Committed Wind	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819	819
New Wind																		
Demand Side Management	911	894	889	889	888	885	887	878	868	858	858	858	858	858	858	858	858	858
Imports																		
Contracted Energy Imports																		
Proposed Energy Imports																		
Non-Contracted Energy Imports	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575
Total Power Resources	**36080**	**36113**	**36199**	**36188**	**36177**	**36174**	**36167**	**36148**	**36138**	**36117**	**36598**	**37069**	**37540**	**38021**	**38011**	**38482**	**38963**	**39434**
Demand																		
2011 Base Load Forecast	32208	32608	33009	33409	33809	34209	34610	35010	35410	35811	36211	36611	37012	37412	37812	38213	38613	39013
Non-Committed Construction Power	40	30	10															
Exports																		
Current Exports	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145	145
Proposed Exports																		
Less Adverse Water																		
Total Demand	**32393**	**32783**	**33164**	**33554**	**33954**	**34354**	**34755**	**35155**	**35555**	**35956**	**36356**	**36756**	**37157**	**37557**	**37957**	**38358**	**38758**	**39158**
System Surplus	**3687**	**3330**	**3035**	**2635**	**2223**	**1820**	**1412**	**992**	**582**	**161**	**242**	**313**	**383**	**464**	**54**	**124**	**205**	**276**
Less: Brandon Unit 5																		
Adverse Water Energy																		
Exportable Surplus	**3687**	**3330**	**3035**	**2635**	**2223**	**1820**	**1412**	**992**	**582**	**161**	**242**	**313**	**383**	**464**	**54**	**124**	**205**	**276**

B AVERAGE ENERGY SUPPLY AND DEMAND TABLES

Recommended Plan

System Supply & Demand Balance (GW.h) at North

Under Average of all Flow Conditions

2011 Base Load Forecast, 2011 DSM - Option 2

Kelsey Rerunnering, Pointe du Bois rebuild 2030/31, Wuskwatim 2012/13, Bipole III Line 2017/18 (West)
Supply Includes: Keeyask 2019/20, Conawapa 2024/25, SCGT's starting in 2041/42, 500kV interconnection in 2019/20
Demand Includes: Potential Sales to Wisconsin Public Service and Minnesota Power

Fiscal Year	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30
Power Resources																	
Hydro Generation	30744	30711	30693	30698	30460	30376	30813	33223	34587	34816	34757	36491	40442	41710	41676	41636	41637
Bipole III					392	392	392	315	315	315	315	315	27	27	27	27	27
Thermal Generation	341	359	343	355	416	457	324	338	330	340	337	334	276	289	307	302	304
Committed Wind	963	963	963	963	963	963	963	963	963	963	963	963	963	963	963	963	963
Demand Side Management	411	508	608	696	699	774	830	882	911	944	971	996	1009	967	947	924	911
Imports	1420	1516	1494	1542	1625	1673	1937	1923	1791	1818	1953	1902	1856	2042	2160	2232	2307
Total Power Resources	**33878**	**34058**	**34100**	**34254**	**34554**	**34635**	**35259**	**37645**	**38898**	**39195**	**39295**	**41000**	**44573**	**45998**	**46080**	**46083**	**46148**
Demand																	
2011 Base Load Forecast	25930	26284	26406	26794	27205	27481	27966	28462	28887	29311	29733	30153	30570	30984	31396	31801	32208
Non-Committed Construction Power	10	25	50	60	85	105	80	75	55	80	100	90	40	25	30	30	35
Current Exports (with MP 250 MW sale)	3307	3307	2265	2161	2161	2161	2161	3500	4139	4213	4213	4213	2081	1902	1902	1902	1737
Proposed Exports													2142	2571	3107	3214	3214
Total Demand	**29247**	**29616**	**28721**	**29015**	**29451**	**29747**	**30207**	**32036**	**33081**	**33605**	**34046**	**34456**	**34833**	**35482**	**36435**	**36947**	**37194**
Exportable System Surplus	**4630**	**4442**	**5379**	**5239**	**5103**	**4888**	**5052**	**5608**	**5817**	**5590**	**5249**	**6544**	**9740**	**10515**	**9645**	**9136**	**8954**

Fiscal Year	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44	2044/45	2045/46	2046/47
Power Resources																	
Hydro Generation	41837	41908	41938	41940	41936	41917	41927	41932	41929	41936	41926	41931	41924	41923	41935	41941	41911
Bipole III	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
Thermal Generation	304	303	304	302	302	261	243	219	192	168	167	246	340	453	568	688	724
Committed Wind	963	963	963	963	963	963	963	963	963	963	963	963	963	963	963	963	963
Demand Side Management	894	889	889	888	885	887	878	868	858	858	858	858	858	858	858	858	858
Imports	2344	2398	2446	2505	2562	2478	2465	2530	2547	2493	2596	2663	2751	2824	2822	2881	3011
Total Power Resources	**46368**	**46488**	**46567**	**46624**	**46675**	**46533**	**46504**	**46538**	**46514**	**46444**	**46536**	**46687**	**46862**	**47048**	**47173**	**47357**	**47492**
Demand																	
2011 Base Load Forecast	32608	33009	33409	33809	34209	34610	35010	35410	35811	36211	36611	37012	37412	37812	38213	38613	39013
Non-Committed Construction Power	30	10															
Current Exports (with MP 250 MW sale)	1704	1704	1704	1704	1704	365	97	97	97	97	97	97	97	97	97	97	97
Proposed Exports	3214	3214	3214	3214	3214	3214	2679	2036	1125	161							
Total Demand	**37557**	**37937**	**38327**	**38728**	**39128**	**38190**	**37786**	**37543**	**37033**	**36469**	**36708**	**37109**	**37509**	**37909**	**38310**	**38710**	**39110**
Exportable System Surplus	**8811**	**8551**	**8239**	**7896**	**7547**	**8343**	**8718**	**8995**	**9481**	**9975**	**9828**	**9578**	**9354**	**9139**	**8863**	**8648**	**8382**

Alternative Development Plan 1 250 MW Interconnection

System Supply & Demand Balance (GWh) at North

Under Average of all Flow Conditions

2011 Base Load Forecast, 2011 DSM - Option 2

Kelsey Rerunnering, Pointe du Bois rebuild 2030/31, Brandon Unit 5 until 2018/19, Wuskwatim 2011/12, Bipole III Line 2017/18 (West)
Supply Includes: Keeyask 2019/20, Conawapa 2024/25, SCGT's starting 2041/42, 250 MW interconnection in 2020/21
Demand Includes: Potential 100 MW Wisconsin Public Service Sale and 250 MW Minnesota Power Sale

Fiscal Year	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30
Power Resources																	
Hydro Generation	30744	30711	30693	30698	30460	30376	30818	33243	34608	34834	34620	36800	40236	41042	41048	41086	41129
Bipole III					392	392	392	315	315	315	315	315	27	27	27	27	27
Thermal Generation	341	359	343	355	416	457	324	337	332	340	360	362	295	285	282	277	285
Committed Wind	963	963	963	963	963	963	963	963	963	963	963	963	963	963	963	963	963
Demand Side Management	411	508	608	696	699	774	830	882	911	944	971	996	1009	967	947	924	911
Imports	1420	1516	1494	1542	1625	1673	1936	1976	1853	1882	2035	1372	1043	1099	1120	1164	1216
Total Power Resources	**33878**	**34058**	**34100**	**34254**	**34554**	**34635**	**35262**	**37717**	**38982**	**39277**	**39264**	**40807**	**43573**	**44382**	**44387**	**44440**	**44530**
Demand																	
2011 Base Load Forecast	25930	26284	26406	26794	27205	27481	27966	28462	28887	29311	29733	30153	30570	30984	31396	31801	32208
Non-Committed Construction Power	10	25	50	60	85	105	80	75	55	80	100	90	40	25	30	30	35
Current Exports (with MP 250 MW Sale)	3307	3307	2265	2161	2161	2161	2161	3500	4139	4213	4213	4213	2451	2347	1977	1902	1737
Proposed Exports																	
Total Demand	**29247**	**29616**	**28721**	**29015**	**29451**	**29747**	**30207**	**32036**	**33081**	**33605**	**34046**	**34456**	**33061**	**33356**	**33403**	**33733**	**33980**
Exportable System Surplus	**4630**	**4442**	**5379**	**5239**	**5103**	**4888**	**5055**	**5680**	**5901**	**5672**	**5218**	**6351**	**10512**	**11026**	**10984**	**10708**	**10550**

Fiscal Year	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44	2044/45	2045/46	2046/47
Power Resources																	
Hydro Generation	41355	41438	41500	41530	41569	41559	41592	41629	41656	41681	41693	41718	41730	41742	41760	41785	41774
Bipole III	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
Thermal Generation	283	284	284	283	282	245	240	243	244	245	249	325	415	519	634	768	808
Committed Wind	963	963	963	963	963	963	963	963	963	963	963	963	963	963	963	963	963
Demand Side Management	894	889	889	888	885	887	878	868	858	858	858	858	858	858	858	858	858
Imports	1212	1242	1275	1316	1355	1404	1465	1510	1553	1598	1667	1726	1807	1871	1890	1947	2061
Total Power Resources	**44733**	**44843**	**44939**	**45007**	**45081**	**45085**	**45165**	**45239**	**45301**	**45372**	**45457**	**45616**	**45799**	**45980**	**46132**	**46348**	**46491**
Demand																	
2011 Base Load Forecast	32608	33009	33409	33809	34209	34610	35010	35410	35811	36211	36611	37012	37412	37812	38213	38613	39013
Non-Committed Construction Power	30	10															
Current Exports (with MP 250 MW Sale)	1704	1704	1704	1704	1704	365	97	97	97	97	97	97	97	97	97	97	97
Proposed Exports																	
Total Demand	**34342**	**34723**	**35113**	**35513**	**35914**	**34975**	**35107**	**35507**	**35908**	**36308**	**36708**	**37109**	**37509**	**37909**	**38310**	**38710**	**39110**
Exportable System Surplus	**10391**	**10120**	**9826**	**9494**	**9167**	**10110**	**10058**	**9732**	**9394**	**9064**	**8749**	**8507**	**8291**	**8070**	**7822**	**7638**	**7381**

Alternative Plan 2 No New Interconnection

System Supply & Demand Balance (GW.h) at North

Under Average of all Flow Conditions

2011 Base Load Forecast, 2011 DSM - Option 2

Kelsey Rerunnering, Pointe du Bois rebuild 2030/31, Wuskwatim 2011/12, Bipole III Line 2017/18 (West)

Supply Includes Conawapa 2027/28, CCGT's starting in 2021/22, SCGT's starting in 2025/26 as required

Fiscal Year	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30
Power Resources																	
Hydro Generation	30741	30709	30692	30698	30463	30383	30585	30611	30663	30618	30553	30549	30383	30313	32846	36385	37245
Bipole III					392	392	392	392	392	392	392	392	392	392	392	186	186
Thermal Generation	341	359	342	355	414	455	334	379	1711	1762	1825	1871	1872	1924	1660	1206	1195
Committed Wind	963	963	963	963	963	963	963	963	963	963	963	963	963	963	963	963	963
Demand Side Management	411	508	608	696	699	774	830	882	911	944	971	996	1009	967	947	924	911
Imports	1420	1515	1487	1535	1610	1658	1739	1947	1733	1773	1825	1864	1736	1764	1406	1126	1234
Total Power Resources	**33875**	**34055**	**34092**	**34246**	**34541**	**34624**	**34842**	**35174**	**36372**	**36451**	**36529**	**36634**	**36355**	**36322**	**38215**	**40790**	**41734**
Demand																	
2011 Manitoba Load	25930	26284	26406	26794	27205	27481	27966	28462	28887	29311	29733	30153	30570	30984	31396	31801	32208
Non-Committed Construction Power							10	15	20	30	50	55	90	120	120	60	40
Current Exports	3307	3307	2265	2161	2161	2161	2161	2161	2161	2161	1996	1963	201	97	97	97	97
Proposed Exports																	
Total Demand	**29237**	**29591**	**28671**	**28955**	**29366**	**29642**	**30137**	**30638**	**31068**	**31502**	**31779**	**32171**	**30861**	**31201**	**31613**	**31958**	**32345**
Exportable System Surplus	**4638**	**4464**	**5420**	**5292**	**5175**	**4983**	**4705**	**4537**	**5304**	**4948**	**4750**	**4463**	**5494**	**5121**	**6602**	**8832**	**9389**

Fiscal Year	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44	2044/45	2045/46	2046/47
Power Resources																	
Hydro Generation	37391	37462	37517	37512	37522	37546	37568	37583	37575	37593	37627	37628	37633	37605	37636	37664	37659
Bipole III	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186
Thermal Generation	1166	1187	1236	1262	1276	1314	1353	1383	1421	1578	1767	1968	2183	2248	2465	2681	2917
Committed Wind	963	963	963	963	963	963	963	963	963	963	963	963	963	963	963	963	963
Demand Side Management	894	889	889	888	885	887	878	868	858	858	858	858	858	858	858	858	858
Imports	1236	1257	1282	1316	1361	1390	1415	1448	1551	1555	1549	1585	1618	1840	1840	1839	1831
Total Power Resources	**41836**	**41944**	**42073**	**42126**	**42193**	**42286**	**42362**	**42431**	**42554**	**42733**	**42949**	**43187**	**43440**	**43699**	**43947**	**44190**	**44413**
Demand																	
2011 Manitoba Load	32608	33009	33409	33809	34209	34610	35010	35410	35811	36211	36611	37012	37412	37812	38213	38613	39013
Non-Committed Construction Power	30	10															
Current Exports	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97
Proposed Exports																	
Total Demand	**32735**	**33116**	**33506**	**33906**	**34306**	**34707**	**35107**	**35507**	**35908**	**36308**	**36708**	**37109**	**37509**	**37909**	**38310**	**38710**	**39110**
Exportable System Surplus	**9100**	**8828**	**8567**	**8220**	**7886**	**7579**	**7255**	**6924**	**6647**	**6425**	**6241**	**6079**	**5932**	**5789**	**5637**	**5480**	**5303**

C. RESOURCE OPTIONS SUMMARY TABLE

	Resource Option	Nominal Capacity (MW)	Flow Related Energy (GW.h)	
			Dependable	Average
Conventional Hydro	Notigi GS	100	585	750
	Manasan GS (High Head)	265	1070	1670
	First Rapids GS	210	890	1400
	Kelsey GS Extension	120	N/A	425
	Birthday GS	320	2100	2100
	Keeyask GS	695	2900	4430
	Conawapa GS	1485	4550	7000
	Gillam Island GS	1000	3150	5040
	Whitemud GS	310	1360	1700
	Red Rock GS (Low Head)	250	N/A	N/A
	Bonald GS	120	N/A	N/A
	Granville GS	125	N/A	N/A
Other Hydro	Run-of-River Hydro	1 to 50	5 to 230	5 to 230
	Kinetic Hydro	1 to 100	8 to 790	8 to 790
Wind	On-Shore Wind	70	193 to 209	227 to 245
Solar	Photovoltaic (Utility Plant Scale)	1 to 300	0 to 265	0 to 265
Geo.	Enhanced Geothermal System	10 to 50	85 to 415	85 to 415
Gas	Simple Cycle Gas Turbine	51	437	65 to 110
	Combined Cycle Gas Turbine	310	2636	1300 to 1750
	Blended Gas Turbine	50	427	100 to 140
Coal	Pulverized Coal Generation	400	2980	NA
	Integrated Gasification Combined Cycle	640	4490	NA
Nu.	Nuclear Power Plant	1350	10650	10650
Biomass	Agricultural Crop Residue	30	225	225
	Wood Waste	20	150	150
DSM	Additional DSM	256	1008	1008
Imp.	Contractual Import Agreements	N/A	N/A	N/A