REVIEW OF MANITOBA HYDRO SUPPLY AND DEMAND TABLES

Joanne Flynn

Manitoba Hydro

Manitoba Hydro's Generation Planning Criteria

- **Capacity Criterion**
  - Manitoba Hydro carries a minimum reserve to account for increase in demand above forecast and for breakdown of plant.
  - Planned generation capacity (MW) must not be less than forecast firm annual peak demand plus a reserve requirement of 12% of forecast firm loads.

- **Energy Resource Planning Criterion**
  - There must be sufficient firm energy sources to meet firm energy demand in the event the lowest recorded coincident water supply conditions are repeated.
  - Sources of dependable energy are: hydro, thermal, wind purchases and energy imports

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Capacity and Energy Defined

- Capacity available
  - Maximum rate of power output
    - Megawatts (MW) that the generator can be relied upon to produce
  - MH system = 6,265 MW
- Energy produced
  - 1 GWh = 1,000 MWh = 1,000,000 kWh
  - MH system generates an average of 32,000 GWh annually
  - Manitoba domestic demand 25,500 GWh annually

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Application of Generation Planning Criteria

- Supply Demand Tables confirm that Generation Planning Criteria are met
  - Dates for new resources are determined
  - Exportable surplus is determined
  - Major input into the system simulation mode (SPLASH)

- Capacity Criterion
  - Application of 12% capacity reserve
  - Create a development plan that ensures no capacity deficits over the 35 year planning horizon

- Energy Criterion
  - Provision of dependable energy by resource type
  - Create a development plan that ensures no dependable energy deficits over the 35 year planning horizon

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Manitoba Hydro's Dependable Energy Sources

- Hydro Energy
  - Dependable inflows, plus
    - Maximum use of Manitoba reservoir storage
- Thermal Energy
  - Station output if operated continuously
  - Derated for outages and maintenance
  - Coal, natural gas
- Wind Energy
  - 85% of average annual wind generation
- Purchased Energy
  - Must be on firm transmission
  - Available under contract
  - Available in off-peak periods from organized market

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Need for New Resources
NFAT 2012 Reference
Selected Years

Date: May 1, 2013

System Firm Energy Demand and Dependable Resources (GWh) @ generation
NFAT
No New Resources

	Fiscal Year		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
7	**Total Power Resources**	5+6	**30 926**	**30 687**	**30 085**	**30 075**	**30 065**	**30 065**	**30 055**	**29 315**	**29 176**	**29 191**	**29 181**
8	**Manitoba Net Load**		**27 033**	**27 276**	**27 707**	**28 119**	**28 540**	**28 974**	**29 419**	**29 860**	**30 293**	**30 758**	**31 233**
9	**Total Net Exports**		**1 804**	**1 804**	**1 804**	**1 804**	**1 804**	**1 804**	**1 804**	**188**	**145**	**145**	**145**
10	**Total Energy Demand**	8+9	**28 837**	**29 080**	**29 511**	**29 923**	**30 344**	**30 778**	**31 223**	**30 048**	**30 438**	**30 903**	**31 378**
11	**System Surplus/Deficit**	7-10	**2 089**	**1 607**	**574**	**152**	**(279)**	**(713)**	**(1 168)**	**(733)**	**(1 262)**	**(1 712)**	**(2 197)**
12	Less : Brandon Unit 5		- 811	- 592									
13	Adverse Water		- 370	- 370	- 370	- 370	- 370	- 370	- 370	- 61			
	Exportable Surplus	11+12+13	**908**	**645**	**204**								

Date: May 1, 2013

System Firm Winter Peak Demand and Capacity Resources (MW) @ generation
NFAT
No New Resources

	Fiscal Year		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
6	**Total Power Resources**	4+5	**6 389**	**6 284**	**6 284**	**6 284**	**6 284**	**6 284**	**6 284**	**5 679**	**5 679**	**5 679**	**5 679**
7	**Manitoba Net Load**		4 832	4 882	4 955	5 027	5 100	5 179	5 260	5 339	5 417	5 500	5 586
8	**Total Exports**		358	358	358	358	358	358	358				
9	**Total Peak Demand**	7+8	**5 190**	**5 240**	**5 313**	**5 385**	**5 458**	**5 537**	**5 618**	**5 339**	**5 417**	**5 500**	**5 586**
10	Reserves		580	586	595	603	612	621	631	641	650	660	670
11	**System Surplus**	6-9-10	**619**	**458**	**376**	**296**	**214**	**126**	**35**	**(301)**	**(388)**	**(481)**	**(577)**
12	Less: Brandon Unit 5		- 105										
	Exportable Surplus	11+12	**514**	**458**	**376**	**296**	**214**	**126**	**35**				

For discussion purposes only - All numbers subject to confirmation

Need for New Resources
NFAT 2013 Update
Selected Years

Date: May 1, 2013

System Firm Energy Demand and Dependable Resources (GWh) @ generation
NFAT 2013 Update
No New Resources

	Fiscal Year		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
7	**Total Power Resources**	5+6	30 871	30 634	30 034	30 026	30 018	30 018	30 008	29 560	29 461	29 451	29 441
8	**Manitoba Net Load**		26 502	26 850	27 201	27 569	27 938	28 317	28 706	29 094	29 478	29 864	30 302
9	**Total Net Exports**		2 056	2 056	1 846	1 804	1 804	1 804	1 804	350	307	307	307
10	**Total Energy Demand**	8+9	28 558	28 906	29 047	29 373	29 742	30 121	30 510	29 444	29 785	30 171	30 609
11	**System Surplus/Deficit**	7-10	2 313	1 728	987	653	276	(103)	(502)	116	(324)	(720)	(1 168)
12	Less : Brandon Unit 5		- 811	- 592									
13	Adverse Water		- 370	- 370	- 370	- 370	- 370	- 370	- 370	- 61			
	Exportable Surplus	11+12+13	1 132	766	617	283				55			

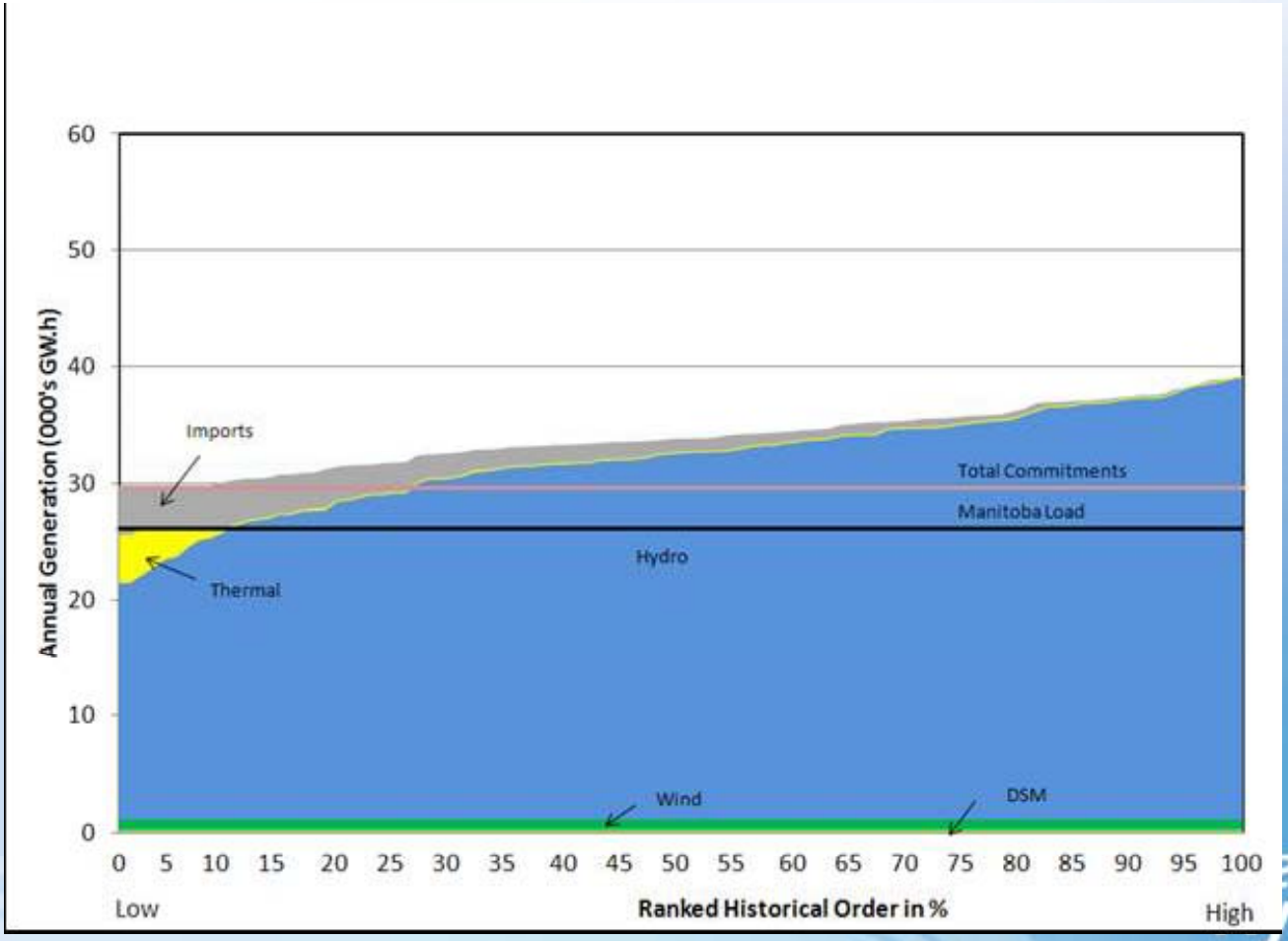
Date: May 1, 2013

System Firm Winter Peak Demand and Capacity Resources (MW) @ generation
NFAT 2013 Update
No New Resources

	Fiscal Year		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
6	**Total Power Resources**	4+5	6 405	6 303	6 306	6 309	6 312	6 312	6 312	5 927	5 927	5 927	5 927
7	**Manitoba Net Load**		4 821	4 884	4 947	5 011	5 078	5 147	5 216	5 286	5 355	5 422	5 500
8	**Total Exports**		413	413	358	358	358	358	358				
9	**Total Peak Demand**	7+8	5 234	5 297	5 305	5 369	5 436	5 505	5 574	5 286	5 355	5 422	5 500
10	Reserves		579	586	594	601	609	618	626	634	643	651	660
11	**System Surplus**	6-9-10	592	420	407	339	267	189	112	7	(71)	(146)	(233)
12	Less: Brandon Unit 5		- 105										
	Exportable Surplus	11+12	487	420	407	339	267	189	112	7			

For discussion purposes only - All numbers subject to confirmation

2014/15 Generation Supply Sources Over a Range of Water Conditions



Dependable Energy
Power Resources

	Power Resources	
	New Power Resources	
	New Hydro	
	Conawapa	
	Keeyask	
1	**Total New Hydro**	
	New Thermal	
	SCGT	
	CCGT	
2	**Total New Thermal**	
	New Imports	
	Contracted	
	Proposed	
3	**Total New Imports**	
4	New Wind	
5	**Total New Power Resources**	1+2+3+4

	Base Supply Power Resources	
	Existing Hydro	
	Existing Thermal	
	Brandon Coal - Unit 5	
	Selkirk Gas	
	Brandon Units 6-7 SCGT	
	Existing Thermal	
	Contracted Imports	
	Proposed Imports	
	Hydro Adjustment	
	Market Purchases	
	Existing Wind	
	Pointe du Bois Rebuild	
	Bipole III Line Reduction	
6	**Total Base Supply Power Resources**	
7	**Total Power Resources**	5+6

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Dependable Energy
Demand & System Surplus/Deficit

	Manitoba Domestic Load	
	2012 Base Load Forecast	
	Construction Power - New Hydro	
	Less: 2012 Base DSM Forecast	
8	**Manitoba Net Load**	
	Contracted Exports	
	Proposed Exports	
	Less: Adverse Water	
9	**Total Net Exports**	
10	**Total Energy Demand**	8+9

11	**System Surplus/Deficit**	7-10
12	Less : Brandon Unit 5	
13	Adverse Water	
	Exportable Surplus	11+12+13

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THANK YOU

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