VOLUME 7

Index – MIPUG Book of Documents

Manitoba Hydro's Needs For and Alternatives To (NFAT) Review

April 8, 2014

Tab #	Description	Sources
1	a) MH response to PUB re table plotting MH firm energy based on DSM Level 2 (with and without the new pipeline load)	a) Manitoba Hydro Exhibit 138. Available online: http://www.pub.gov.mb.ca/nfat_hearing/NFAT%20Exhibits/MH-138.PDF
2	a) NFAT Transcript – Antoine Hacault cross-exam of Darren Rainkie re: sunk cost accounting treatment	a) NFAT Transcript from March 21, 2014. Cross-examination of Manitoba Hydro Financial Panel, Mr. Darren Rainkie and Mr. Antoine Hacault. Pages 3412-3417. Available online: http://www.pub.gov.mb.ca/nfat/pdf/hearing/march_21_2014.pdf
3	a) Graphs on the Likelihood of the Cost Variation to Conawapa and Keeyask – Created by MIPUG b) MH-104-8: Updated calculations all plans with new info provided Mar 10 2014	a) Data from MH-Exhibit 104-8 pages 1 and 2. b) MH-104-8 from NFAT filing. Available online: http://www.pub.gov.mb.ca/nfat_hearing/NFAT%20Exhibits/MH-104-8.pdf

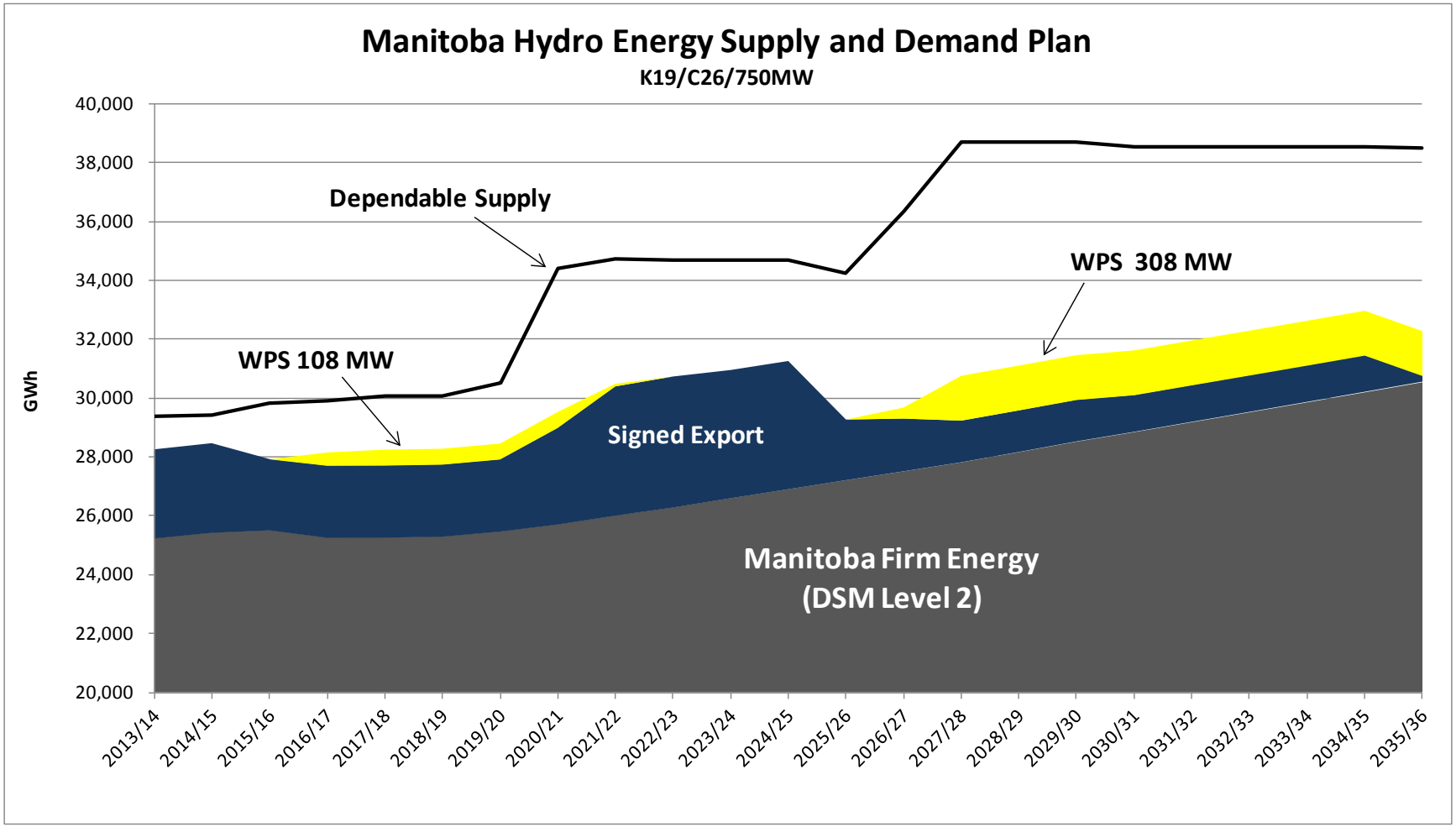
TAB 1

NEEDS FOR AND ALTERNATIVES TO (NFAT)

Manitoba Hydro to recreate chart (assuming PDP) to plot the MH firm energy based on the DSM Level 2, no pipeline scenario. Manitoba Hydro to also color code and stack the signed export contracts, by firm, fixed price, energy sales.

Response:

Manitoba Hydro has prepared a chart that represent the DSM Level 2, no pipeline scenario and a chart that represent the DSM Level 2, plus pipeline scenario.


Manitoba Hydro Energy Supply and Demand Plan
K19/C26/750MW
GWh
40,000
38,000
36,000
34,000
32,000
30,000
28,000
26,000
24,000
22,000
20,000
Dependable Supply
WPS 308 MW
WPS 108 MW
Signed Export
Manitoba Firm Energy
(DSM Level 2)
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
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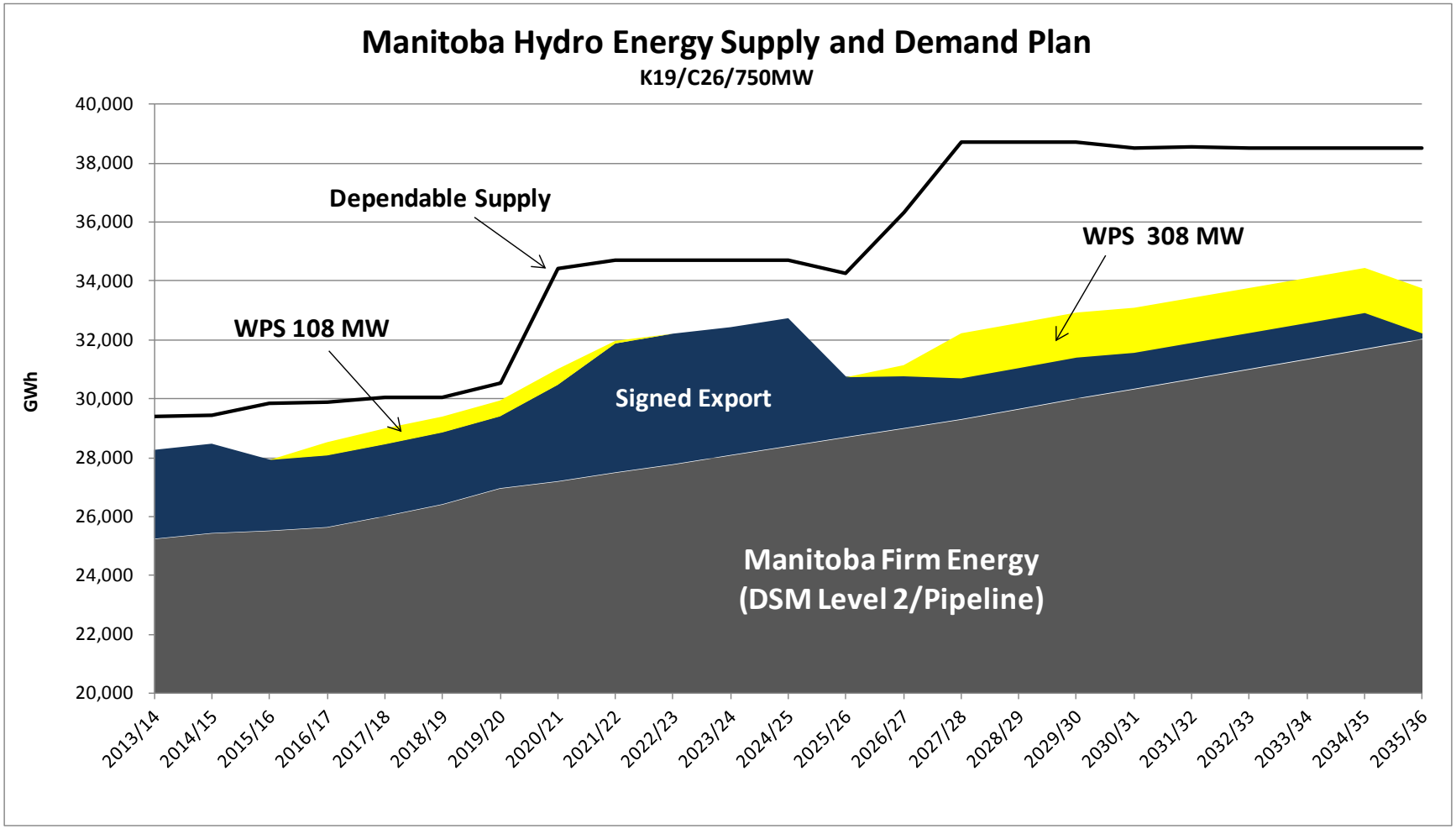
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2027/28
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2029/30
2030/31
2031/32
2032/33
2033/34
2034/35
2035/36

TAB 2

but over time your levelized cost will -- will come down.

The rental income that you expect will go up over time if you believe that over time the economy will improve and -- and the cost of housing will -- will result in you being able to charge a higher rental rate. And over time those two (2) lines will cross and over a hundred year life of an asset it makes sense.

That's why if you take little snippets of time in looking at this, you get the wrong impression about what type of an investment this is. And -- and that's what I've been, I think, trying to caution in the last couple days with that.

CONTINUED BY MR. HACAULT:

MR. ANTOINE HACAULT: If the exchanges have been finished, I -- I just have what I hope will be two (2) questions. Firstly, page 2 of our book of documents. We've looked at this -- or considered this information before.

One (1) of the things that is hitting the All Gas Plan is that in each of the eighteen (18) years we are depreciating Conawapa and Keeyask and putting that to the income statement, correct?

MR. DARREN RAINKIE: Yes, that was the assumption in the financial analysis.

MR. ANTOINE HACAULT: Okay. Now, as I understood your evidence before, sir, if the government says no Conawapa, no Keeyask, what you would do is write this off against retained earnings, correct?

(BRIEF PAUSE)

MR. DARREN RAINKIE: I suppose in that extreme, capital 'H', hypothetical...

MR. ANTOINE HACAULT: Well, we're here to explore alternatives, sir. I don't think it's that hypothetical. It's alternatives to --

MR. DARREN RAINKIE: Well -- well, sir, I suppose if -- it to me is a hypothetical that a government -- governments change over time, sir, that a government would say never build Keeyask or Conawapa. They might say it's not in your development plan now. It doesn't mean that at some future point it wouldn't come back in.

So let's just, you know, be fair about it, right. And that's the difficult part about assessing the accounting side of this, is what is the circumstance we're dealing with? Is it a circumstance

where these plants are deferred forever and -- and it's never going to come back into the power resource plan as a -- as a resource? In that case, I think our auditors would be pushing for us to -- to write these off rather quickly.

If it's a situation where we're saying not now -- these -- these are the -- as I understand it anyway from my, you know, accountant perspective as opposed to a power resource planning person, these are the most economic plants that we have in the great abundant resources of Manitoba that we have and will always probably be in our stack somewhere.

In that case we would, on an annual basis, have to assess the amount that we were holding in construction work in progress and see if there was continuing benefits of those -- of -- of the costs. Some of those costs may have enduring benefits. Studies about the geotechnical aspects that wouldn't change because the landscape is not changing. Some of the studies environmental may not have benefits because environmental changes may occur in -- in terms of legislation. So you may have to write some of those costs off sooner rather than later.

It's -- it's a -- it's a -- for an accounting it's an impairment test. Do these costs

have value? The answer is yes. The auditors will likely let us to continue to amortize them. If no, then over time we would have to write them off. I suppose the other possibility is that if rate-regulated accounting continues over the long run and doesn't go away in the next couple of years, which is another issue that's still out there, we could amortize them over a period of time.

And that -- I think this was kind of a -- the assumption and the financial analysis was kind of a middle zone on that. We'll amortize them not over -- not over a short period of time to make the -- to make the All Gas look really bad, we'll amortize them over eighteen (18) years. We're not going to assume write off day one (1) and we're not going to assume that they stay on our books forever, which I think would be unrealistic, but some middle zone there, sir.

MR. ANTOINE HACAULT: So there's a difference between the real world and your assumptions, sir?

MR. DARREN RAINKIE: Financial modelling by necessity of two hundred and sixteen (216) runs has to make some assumptions, sir. It -- it's -- or else we would turn ourselves in knots trying to produce each one of these scenarios.

We tried to do our best to provide what we thought were objective ways of looking at the world so that we wouldn't be challenged that we were just trying to unnecessarily burden one -- one plan or the other.

MR. ANTOINE HACAULT: Understood. But if you're saying in the real world you would assess whether or not you needed to write off 88 and -- $89 million per year, that's about 6 percent if -- rate increase. Just if -- if you hit the expense sheet in 2016 with $88 million, you need about a 6 percent rate increase to handle that, correct, if it's not feathered in?

MR. DARREN RAINKIE: Yeah, mathematically but as you just said we would feather that in, sir, over time.

MR. ANTOINE HACAULT: The last thing, and sorry I just -- looking at the time, is page 9. This is I think Plan 6. It's where gas is contemplated but it's still possible to go to Conawapa. There's some paths that still allow us, even though we go on it, the flexibility of going to Conawapa.

So if you have the flexibility of going to Conawapa, sir, not in the assumption world but in the real world, if that door has not been closed on

you, would you penalize this plan by $21 million per year?

(BRIEF PAUSE)

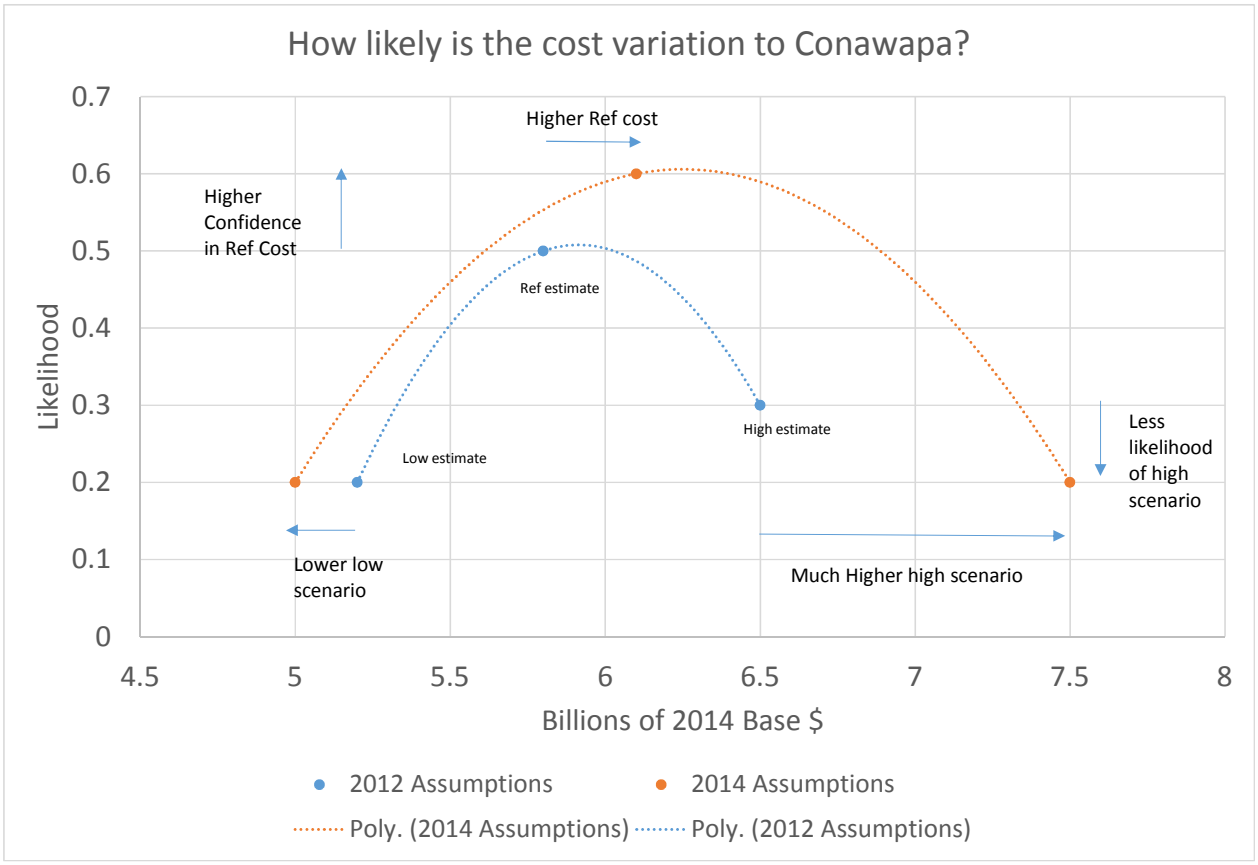
MR. DARREN RAINKIE: Sir, as I just indicated earlier, this -- this assume -- this assumed that we would never build Conawapa. In the real world if it was still a possibility in our Power Resource Plan over the long run, yes, we would asset it as time goes on and only write it off when we had to.

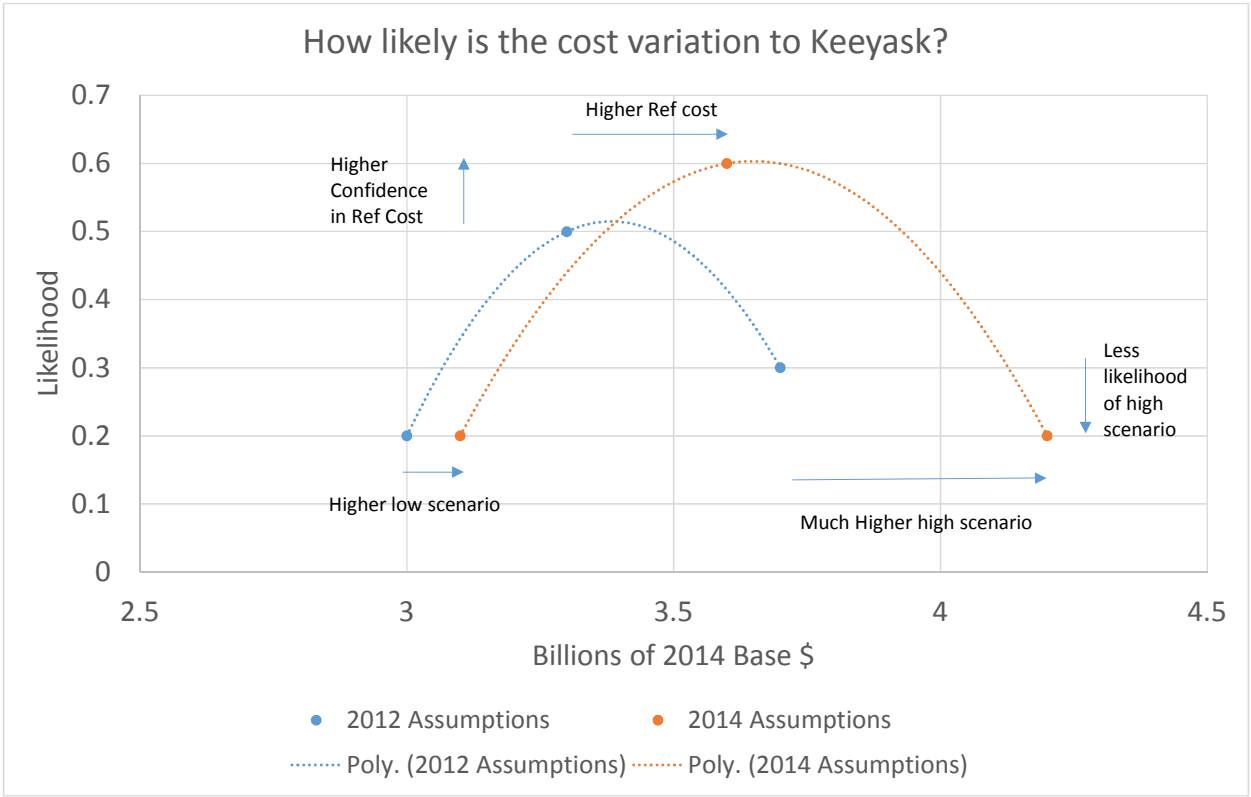
MR. ANTOINE HACAULT: But we don't have a financial modelling which corresponds with your real world view, do we, sir?

MR. DARREN RAINKIE: Well, sir, this -- this amount -- this amount of amortization over the long run would be equivalent to a 1 percent rate increase. So, you know, at the back end of this analysis there's differentials of seventy (70) -- seventy (70) points between the Preferred Plan and the All Gas Plan, so, you know, I guess that's -- try to say is, We're doing long-term financial analysis.

You could -- you could run a scenario that would take that out but I'm not sure it would change the -- in and of itself the overall results of

TAB 3





Data from MH Exhibit 104-8; Page 1 for costs, page 2 for likelihood

NEEDS FOR AND ALTERNATIVES TO (NFAT)

Manitoba Hydro Undertaking #27

Manitoba Hydro to file the additional calculations performed on all of the plans upon which Manitoba Hydro conducted a probabilistic analysis, using base level DSM, with respect to the new information provided as of March 10, 2014.

Response:

Please see the attached Updated Economic Uncertainty Analysis Results.

Updated Economic Uncertainty Analysis Results

The economic uncertainty analysis as provided in Manitoba Hydro's Exhibit 104-2 has been further updated to reflect the following:

- addition of Plan 6 (K-19/Gas31/750MW) and Plan 12 (K-19/C31/750MW),
- Plans 5 and 14 are now shown with no WPS investment in the new 750 MW US interconnection (Manitoba Hydro is assumed to pay the WPS portion of investment costs); Plan 5 and Plan 14 are now labeled as K-19/Gas25/750MW (WPS Sale & no WPS Inv) and K-19/C25/750MW (WPS Sale & no WPS Inv), respectively.

The following updates reflected in Manitoba Hydro's Exhibit 104-2 are also applied:

- updated capital costs for Keeyask and Conawapa,
- updated probability weightings associated with the Capital Costs factor,
- updated treatment of common factors (costs and revenues common to all alternatives).

Updated Capital Costs

As a result of recently receiving General Civil Contract bids for Keeyask, Manitoba Hydro has updated its capital cost estimates for Keeyask and Conawapa. The updated capital cost estimates used in the updated economic uncertainty analysis, in billions of 2014 base dollars, are provided in the table below. Consistent with the assumptions documented in the NFAT submission, all costs prior to June 2014 are not included in the totals as they are considered sunk and having been made to protect the in-service dates shown in the table.

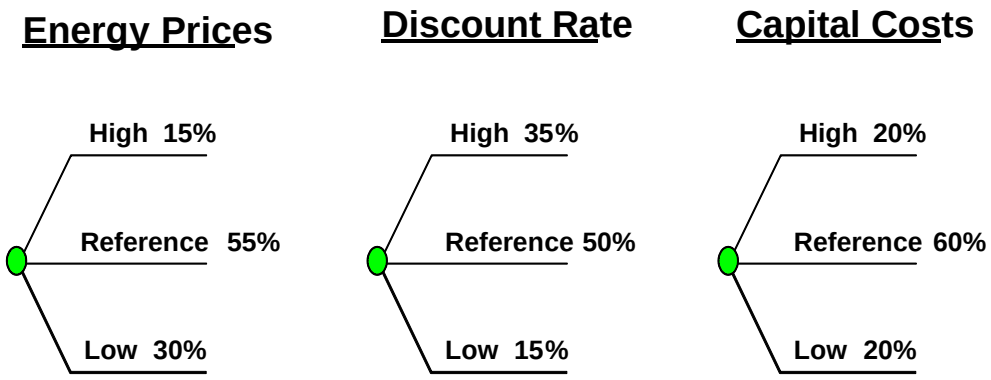
Updated Capital Cost Estimates for Keeyask and Conawapa
Used in Economic Uncertainty Analysis

(Billions of 2014 Base $)

	Keeyask - 2019			**Keeyask – 2022**			**Conawapa – 2025**			**Conawapa - 2026**			**Conawapa - 2031**		
	Low	Ref	High	Low	Ref	High	Low	Ref	High	Low	Ref	High	Low	Ref	High
2012 NFAT Analysis	3.0	3.3	3.7	3.1	3.4	3.9	5.1	5.7	6.4	5.2	5.8	6.5	5.3	6.0	6.7
2014 Update	3.1	3.6	4.2	3.1	3.7	4.4	5.0	6.1	7.5	5.0	6.1	7.5	5.2	6.4	7.9

Updated Probability Weightings

As described in Appendix 9.3 of the NFAT submission, the Capital Costs factor and associated probability weightings apply to capital costs for hydro-electric generation, natural gas-fired generation, wind generation and transmission line and station. To reflect the greater certainty in the new estimate for Keeyask and the enhanced labour productivity reserve methodology, the low, reference and high probabilities have been updated. The updated probabilities are presented below. The reference capital cost scenario probability weighting has been updated to 60% from the 50% used in the NFAT submission and the high capital cost scenario probability weighting has been updated to 20% from the 30% used in the NFAT submission. The probability weighting for the low capital cost scenario has not changed from that assumed in the NFAT submission.



Results

The latest NPV results with the three updates are presented in the quilt and table below. The results for Plan 1, Plan 2, Plan 4 and Plan 8 are unchanged from those provided in MH Exhibit 104-2. The results for Plan 6 and Plan 12 have been added to the quilt and table below. The results for Plan 5 and Plan 14 have been adjusted for the assumption that WPS does not invest in the new 750 MW US interconnection and Manitoba Hydro pays that portion of investment costs. The assumption that the WPS Sale is included in Plan 5 and Plan 14 remains unchanged.

Relative to All Gas – Ref – Ref – Ref, expected values range from essentially zero to more than $600M. While Plan 4 has the highest expected value, this plan is no longer realistically viable and the economic benefits can only be considered as hypothetical. Excluding Plan 4, Plan 6 has the highest expected value. Plan 1 has the lowest expected value. Again, relative to All Gas – Ref – Ref – Ref, 10^{th} percentile values range from -$700M to -$2.9B. All plans have some

downside risk. Excluding Plan 4 because it is no longer viable, Plan 2 has the least downside risk. Plan 14 has the most downside risk followed by Plan 12.

Revised Capital Costs and Revised Treatment of Common factors

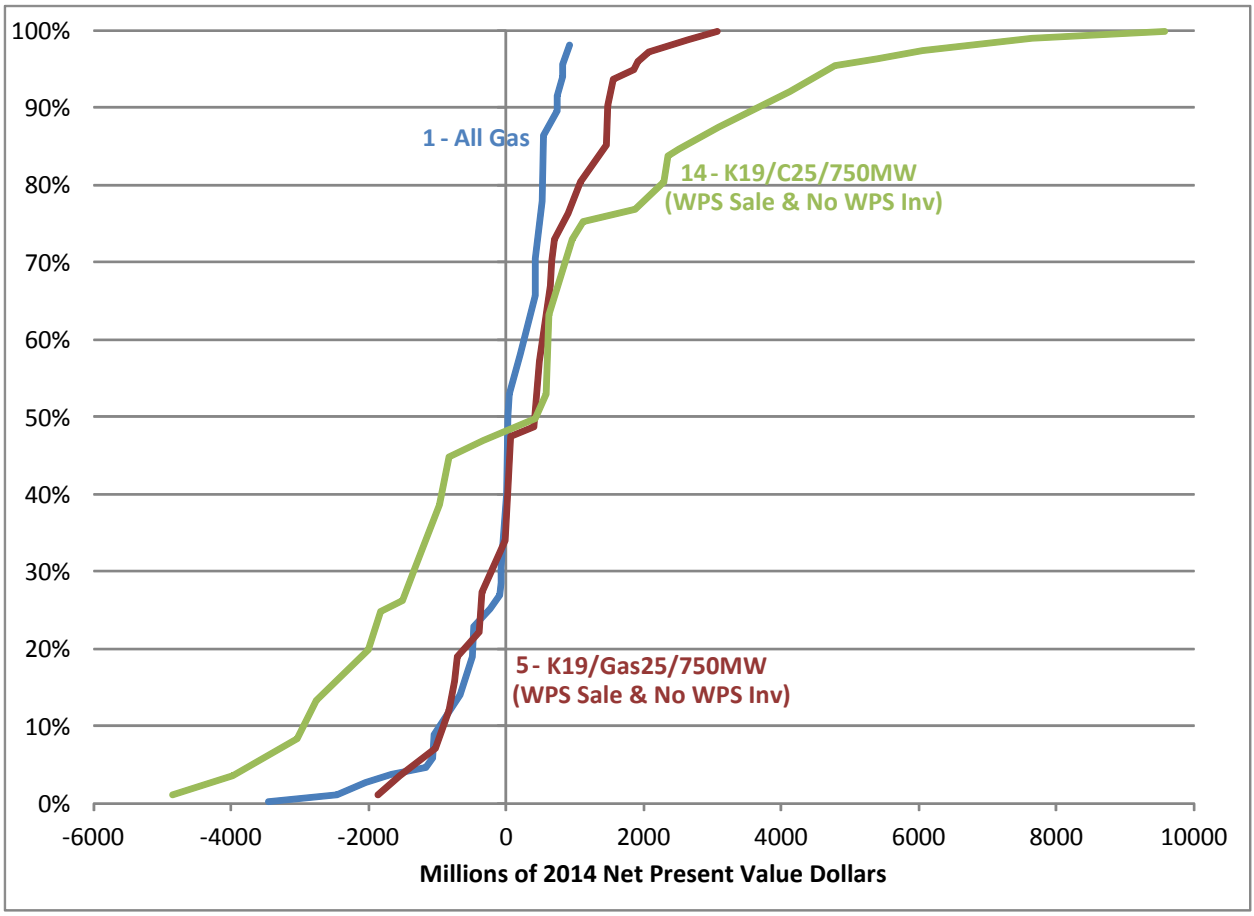
Development Plan			1	2	4	8	6	12	5	14
			All Gas	K22/Gas	K19/Gas24 /250MW	CCGT/C26	K19/Gas31 /750MW	K19/C31 /750MW	K19/Gas25 /750MW	K19/C25 /750MW
									WPS Sale & no WPS Inv	
Energy Prices	Discount Rates	Capital Costs	Millions of 2014 NPV Dollars							
Low	Low	H	-1062	-1401	-851	-1501	-1079	-2143	-758	-1825
		Ref	-68	16	646	106	392	-53	698	424
		L	734	1205	1898	1449	1613	1750	1906	2359
	Ref	H	-463	-1751	-1512	-2398	-1793	-3717	-1546	-3969
		Ref	208	-677	-334	-1085	-614	-1977	-355	-2010
		L	750	232	658	15	369	-476	637	-325
	High	H	-88	-1782	-1761	-2625	-2060	-4202	-1872	-4838
		Ref	416	-891	-748	-1480	-1033	-2668	-820	-3044
		L	823	-133	110	-519	-172	-1345	61	-1500
Ref	Low	H	-2033	-120	543	325	298	1410	-7	1869
		Ref	-1039	1296	2040	1932	1770	3501	1449	4118
		L	-237	2486	3292	3275	2991	5304	2658	6053
	Ref	H	-671	-585	-260	-910	-517	-1204	-707	-1345
		Ref	0	489	917	403	662	536	484	614
		L	542	1397	1910	1503	1645	2037	1477	2300
	High	H	17	-716	-620	-1343	-880	-2214	-1034	-2759
		Ref	520	175	393	-198	148	-680	18	-966
		L	927	933	1251	762	1008	643	899	578
High	Low	H	-3454	892	1647	2005	1333	4820	402	5388
		Ref	-2460	2309	3143	3612	2804	6911	1858	7638
		L	-1658	3498	4396	4955	4025	8714	3066	9573
	Ref	H	-1158	402	797	469	526	1178	-103	1125
		Ref	-487	1476	1974	1782	1704	2918	1088	3084
		L	55	2384	2967	2882	2687	4418	2081	4770
	High	H	-82	210	368	-156	115	-352	-384	-824
		Ref	422	1101	1381	989	1143	1182	669	969
		L	828	1859	2239	1949	2003	2505	1549	2513

Development Plan	1	2	4	8	6	12	5	14
	All Gas	K22/Gas	K19/Gas24 /250MW	CCGT/C26	K19/Gas31 /750MW	K19/C31 /750MW	K19/Gas25 /750MW	K19/C25 /750MW
							WPS Sale & no WPS Inv	
	Millions of 2014 NPV Dollars							
10th Percentile -"Risk"	-953	-862	-727	-1457	-1007	-2512	-909	-2946
25th Percentile	-244	-622	-290	-980	-556	-1482	-367	-1760
75th Percentile	483	1026	1339	916	1099	1232	824	1105
90th Percentile - "Reward"	738	1448	2019	1898	1749	3239	1475	3653
Expected Value	-9	268	651	143	386	115	268	120
Ref-Ref-Ref NPV	0	489	917	403	662	536	484	614

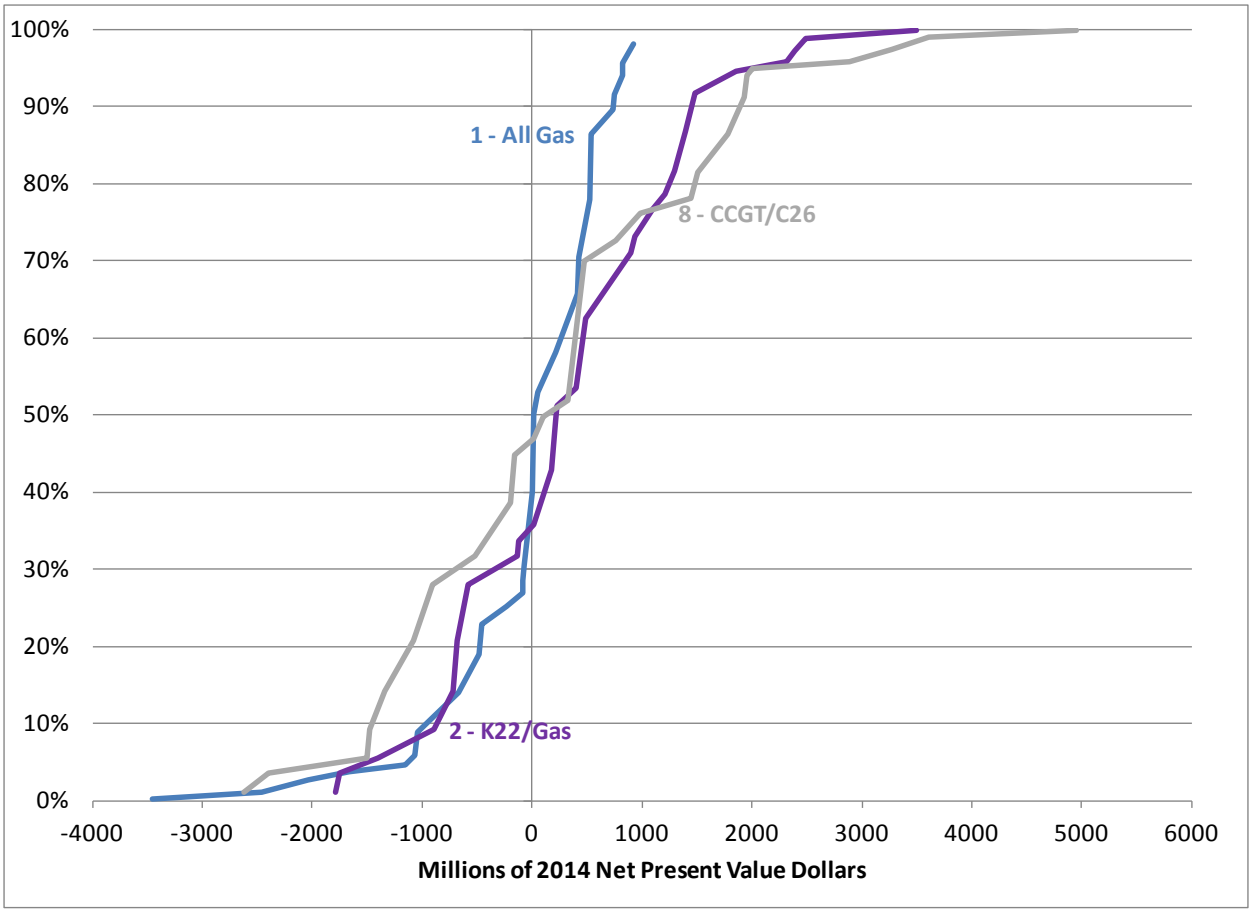
S-curves are provided below for the following four sets of comparisons:

1) Plan 1, Plan 5, Plan 14
2) Plan 1, Plan 2, Plan 8
3) Plan 1, Plan 2. Plan 6
4) Plan 1, Plan 6, Plan 8.

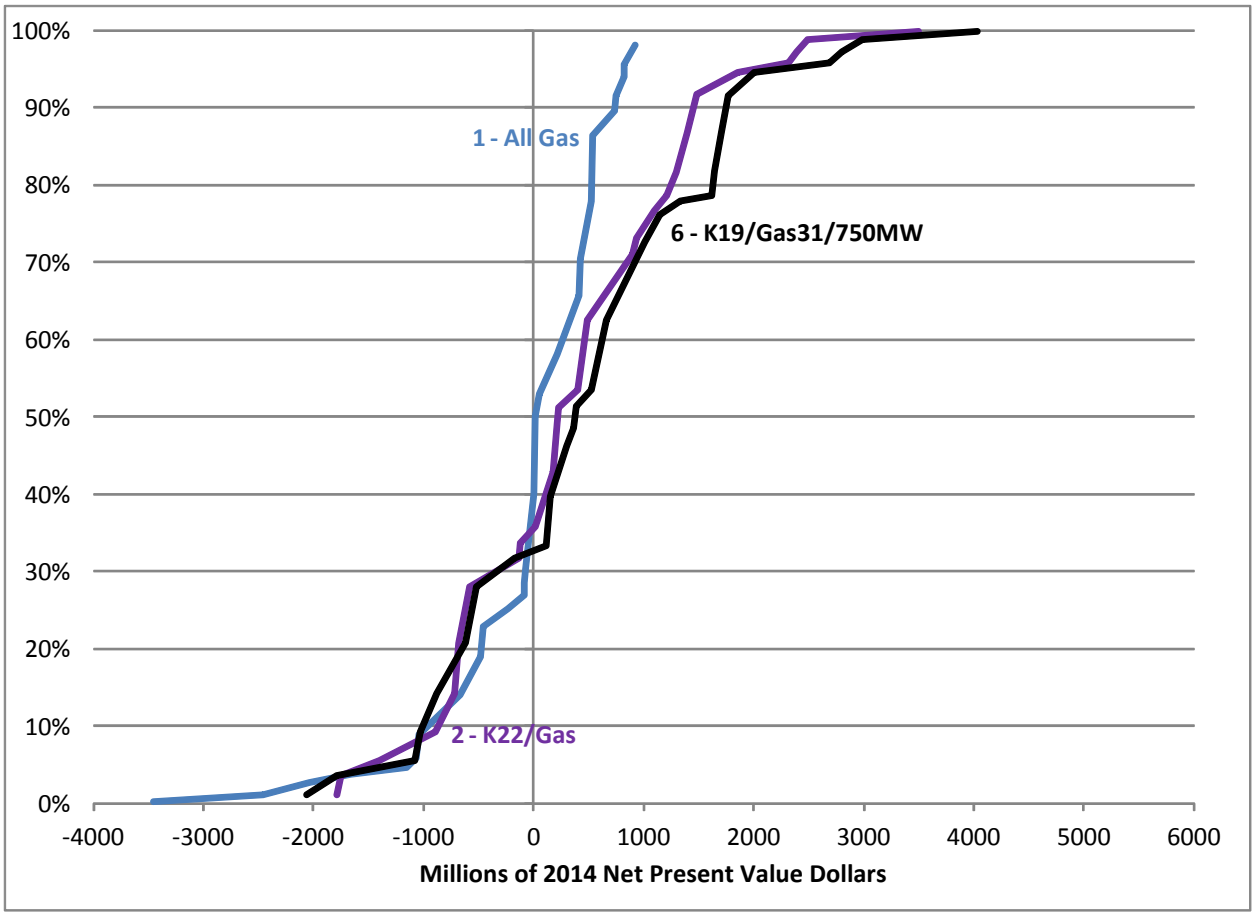
S-Curves - Plans 1, 5 and 14



S-Curves - Plans 1, 2 and 8



S-Curves - Plans 1, 2 and 6



S-Curves - Plans 1, 6 and 8