

REFERENCE:**PREAMBLE TO IR (IF ANY):****QUESTION:**

What were the utilization rates of Bipoles I and II over the past 5 years?

RATIONALE FOR QUESTION:**RESPONSE:**

Please see the following table:

Year	Utilization	
	Bipole 1	Bipole 2
2011	71.90%	76.60%
2012	63.00%	68.00%
2013	67.40%	75.80%
2014	65.70%	74.30%
2015	66.22%	78.13%
2016	67.07%	74.18%

For Manitoba Hydro HVDC system, utilization rate is defined as output divided by maximum capacity.

REFERENCE:

PREAMBLE TO IR (IF ANY):

QUESTION:

- a) Is the 15-year agreement to sell 250 megawatts of firm capacity to Minnesota Power, beginning in 2020, predicated on the completion of Bipole III?
- b) Is the 20-year agreement to sell 100 megawatts of renewable hydroelectricity to SaskPower, starting in 2020, predicated on the completion of Bipole III?
- c) Would the aforementioned export contracts have taken place in the absence of Bipole III?

RATIONALE FOR QUESTION:

RESPONSE:

- a) Bipole III is being built as a reliability project and is needed regardless of whether Keeyask and its associated export contracts ever proceeded. However once the decision to proceed with Bipole III was made, the decisions on Keeyask and its associated export sales were made. With regard to the 250 MW Sale to Minnesota Power, this contract was predicated on the construction of Keeyask. Had a decision not to proceed with construction of Keeyask been made before June 1, 2014, Manitoba Hydro could have terminated the sale.
- b) The sale to Saskatchewan was only possible because of the surplus capacity and energy resources made available as a result of Keeyask and the new import capability associated with the new 500 kV interconnection to the US. Had Bipole III been built but not Keeyask and the interconnection, the sale to Saskatchewan would not have occurred.
- c) The export sale to Minnesota Power was reliant on the construction of Keeyask and the new US interconnection. Had Keeyask not been committed to, this contract would have been terminated. Had Bipole III not been committed to, the Keeyask project would not have been possible.

REFERENCE:

Tab 2, Page 44

PREAMBLE TO IR (IF ANY):

QUESTION:

In section 2.5.2 of Tab 2 of the Application, Manitoba Hydro notes \$2.5 billion had been spent on the Keeyask Project at the time of their review in September, 2016.

- a) Can Manitoba Hydro provide a complete breakdown and description of the costs incurred at the time of review (which led to the \$2.5 billion)?
- b) Can Manitoba Hydro confirm that these costs are as of September 2016?
- c) Can Manitoba Hydro provide a current and complete estimate of the cost spent on the Keeyask Project as at the filing of this Application on May 12, 2017?

RATIONALE FOR QUESTION:

RESPONSE:

a) The table below provides a breakdown and description of the costs incurred on the Keeyask Project at the time of Boston Consulting Group’s (BCG) review. The table describes the \$2.5 billion costs spent to date as of May 31, 2016.

Table 1 - Keeyask Incurred Costs (in Billions \$)	
Item	Actual Costs Incurred as of May 31, 2016
Generating Station Costs	
Final Design Engineering – Hatch	0.066
Camp Operations Services - Fox, York and Sodexo Joint Venture	0.062
Maintenance Services - Maintenance Services Joint Venture	0.022
Main Camp – Britco	0.291
South Access Road - Amisk Construction	0.052
General Civil Works - BBE Hydro Construction	0.622
Reservoir Clearing - Amisk Construction	0.025
Spillway Gates, Guides, Hoists, Towers and Monorail Crane – Canmec Industriel Inc.	0.022
Intake Gates, Guides and Hoists - Canmec Industriel Inc.	0.016
Turbines & Generators - Voith Hydro	0.031
Other Generating Station Costs	0.883
Generation Outlet Transmission (GOT)	0.046
Interest	0.372
Total	2.510

b) As summarized in part a), \$2.5 billion was spent on Keeyask as of May 31, 2016. While the BCG report was issued in September 2016, their analysis occurred between June and August of that year based on cost data current to the end of May 2016.

- c) A summary of actual costs incurred as of April 30, 2017, the nearest month end to the filing date of May 12, 2017, is provided below:

Table 2 - Keeyask Incurred Costs (in Billions \$)	
Item	Actual Costs Incurred as of April 30, 2017
Generating Station Costs	
Final Design Engineering – Hatch	0.084
Camp Operations Services - Fox, York and Sodexo Joint Venture	0.105
Maintenance Services - Maintenance Services Joint Venture	0.034
Main Camp – Britco	0.296
South Access Road - Amisk Construction	0.061
General Civil Works - BBE Hydro Construction	1.072
Reservoir Clearing - Amisk Construction	0.046
Spillway Gates, Guides, Hoists, Towers and Monorail Crane - Canmec Industriel Inc.	0.037
Intake Gates, Guides and Hoists - Canmec Industriel Inc.	0.032
Turbines & Generators - Voith Hydro	0.069
Other Generating Station Costs	0.961
Generation Outlet Transmission (GOT)	0.075
Interest	0.476
Total	3.348

REFERENCE:

Tab 2, Page 44

PREAMBLE TO IR (IF ANY):

QUESTION:

In section 2.5.2 of Tab 2 of the Application, Manitoba Hydro notes \$1.3 as the estimated cancellation cost. Can Manitoba Hydro provide a current and detailed breakdown of this cancellation cost estimate?

RATIONALE FOR QUESTION:

RESPONSE:

Based on an analysis in the spring of 2017, the potential costs of abandoning the Keeyask Project is estimated to be at least \$4.15 billion of which \$2.8 billion is sunk costs and \$1.35 billion is additional cancellation costs. The sunk costs includes all costs spent to date, as well as committed costs which Manitoba Hydro would have to bear to the next milestone for key contracts. The additional cancellation costs include Manitoba Hydro costs associated with managing the ramifications resulting from cancelling the project such as demobilization and salvage, short term employee contract buyouts, breakage fees from various contracts, site and environmental remediation, long term environmental monitoring, interest and escalation.

REFERENCE:

MFR-72

PREAMBLE TO IR (IF ANY):

QUESTION:

Boston Consulting Group's (BCG) Bipole III, Keeyask and Tie-Line review assumed demand growth of 1.5%.

- a) Given that gross firm energy and total peak projections in the Integrated Financial Forecast (IFF16) have fallen 1.2% over the 11-year forecast period to 2026/27, what is the impact on the need for new generation?
- b) Can Manitoba Hydro confirm that its projections exclude any impact of incremental DSM programs from Efficiency Manitoba?

RATIONALE FOR QUESTION:

RESPONSE:

- a) Manitoba Hydro would like to clarify that the load growth has not fallen by 1.2 %; rather, it has fallen to 1.2% (in MH16) over the prior projection of 1.5%. Under the load forecast imbedded in MH16-Update, load growth has fallen to 0.9%.

Manitoba Hydro notes that the BCG analysis was based on the assumptions in the 2015 Resource Planning Assumptions and Analysis, which included a Keeyask 2019/20 in-service date, Bipole III completed in 2018/19, and utilized the 2015 DSM Forecast of 824 MW and 3498 GWh achieved by 2029/30.

The need for new generation using the 2015 assumptions was 2033/34. Using the 2016 MH16 Update assumptions, the need for new generation changes to 2039/40. The following tables show the changes to supply/demand balances for energy and capacity under varying assumptions.

Changes to Dependable Energy (GWh)												
Fiscal Year	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44
System Surplus (Deficit) 2015 RPAA, No New Resources (BCG Assumptions)	1749	1137	470	69	(590)	(1236)	(1845)	(2442)	(3063)	(3687)	(4301)	(4929)
System Surplus (Deficit) 2016 RPAA, No New Resources	3145	2542	1935	1574	994	424	(157)	(728)	(1324)	(1919)	(2503)	(3098)
System Surplus (Deficit) 2016 IFF, No New Resources	4027	3449	2868	2436	1937	1454	961	477	(33)	(539)	(1037)	(1544)
System Surplus (Deficit) 2017 RPAA, No New Resources (2016 IFF Update)	3011	2592	2170	1732	1251	783	344	(485)	(470)	(821)	(1253)	(1696)

Changes to Winter Peak Capacity (MWs)												
Fiscal Year	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44
System Surplus (Deficit) 2015 RPAA, No New Resources (BCG Assumptions)	12	(103)	(232)	(86)	(224)	(353)	(481)	(609)	(630)	(761)	(892)	(1025)
System Surplus (Deficit) 2016 RPAA, No New Resources	480	360	238	388	261	133	5	(122)	(141)	(271)	(401)	(530)
System Surplus (Deficit) 2016 IFF, No New Resources	719	605	490	647	540	434	328	222	225	117	8	(100)
System Surplus (Deficit) 2017 RPAA, No New Resources (2016 IFF Update)	479	383	285	463	352	254	157	32	43	(155)	(254)	(355)

b) The DSM savings in the 2016 MH16 Update were based on the 2016/17 Demand Side Management Plan with an update for the 2017/18 fiscal year only to reflect the 2017/18 Demand Side Management plan provided in PUB MFR 61. The remainder of the DSM forecast came from the 2016/17 Demand Side Management Plan, with achieved savings removed. At this time Manitoba Hydro has no additional information on potential incremental DSM programs from Efficiency Manitoba.

REFERENCE:

Tab 2, Page 43

PREAMBLE TO IR (IF ANY):

QUESTION:

On page 43 of its Application, Manitoba Hydro states:

“In examining the original decision, BCG analyzed the NPV of Keeyask (2025/26 ISD) and Keeyask (2019/20 ISD plus U.S. Tie-Line Project) against a base case of gas fired generation (2022+ ISD) and concluded that the Keeyask 2019/20 ISD with U.S. Tie-Line Project provided the greatest benefits to both Manitoba Hydro and the Province.” Can Manitoba Hydro reconcile or qualify this with the following statements from BCG?

In BCG’s Bipole III, Keeyask and Tie-Line review, found in MFR-72, they state:

- 1) “Conversely, the decision to build Keeyask and its associated infrastructure was an imprudent one due to a failure to fully assess the risks associated with moving forward”; and,
- 2) “All three projects - a Bipole III, Keeyask, and the associated tie-line - should have been reviewed on an aggregate basis, instead of individually, to properly assess the collective risks of conducting all projects at once. While a Bipole III could have been pursued as a stand-alone project, the feasibility of Keeyask and the tie-line were both dependent on one another, and on construction of a Bipole III as well”

RATIONALE FOR QUESTION:

RESPONSE:

Manitoba Hydro’s interpretation of the above statement(s) is that BCG concluded that at a base case with a “P50” level of certainty (i.e. equal likelihood of actual outcomes being higher as likelihood of being lower), that the 2019/20 ISD with U.S. Tie-Line Project offered the greatest net benefit of the alternatives considered as measured by NPV and remittances

to the Province of Manitoba. However, BCG also notes (Exhibits 14 and 16) that the range of potential outcomes under this alternative is wider than under the Gas Generation alternative. As such, the “Keeyask ’19 + Tie Line” alternative was the most sensitive and had the largest upside and downside. This, in Manitoba Hydro’s view, would be a function of significantly higher upfront capital costs, higher potential for negative variance in capital costs, and incremental reliance on export prices meeting forecasts. As such, the decision to proceed with Keeyask was viewed by BCG as imprudent in that the negative outcomes of downside scenarios (e.g. 75th percentile) were too large relative to the incremental benefit in the base case or in comparison to the scale of Manitoba Hydro’s operations and finances.

As to Statement (2), Manitoba Hydro infers that BCG’s conclusion is that assessing Bipole III independently of Keeyask and the U.S. Tie-line may have limited full consideration of the additional risks for a company of Manitoba Hydro’s size, rate base and then financial strength constructing two significant projects concurrently via a then estimated \$10.5 billion of debt issuance. Manitoba Hydro would point out that numerous financial forecasts, inclusive of those reviewed at NFAT leading up to the approval of Keeyask and the Tie-line included the impact of the simultaneous construction of Bipole III.

REFERENCE:

Rudimentary Model of PCOSS18.xlsx

PREAMBLE TO IR (IF ANY):

QUESTION:

Can Manitoba Hydro confirm that the cost item in cell “D83” of the “Allocated Costs” tab, denoted as “Wind & Water Rentals”, includes variable hydraulic operation and maintenance costs?

RATIONALE FOR QUESTION:

To confirm GSS/GSM’s understanding of the model.

RESPONSE:

Cell D83 contains a label. Manitoba Hydro infers the question is referring to costs in cell G83. If so, please see Manitoba Hydro’s response to PUB/MH I-157 for details of the costs included.

REFERENCE:

Rudimentary Model of PCOSS18.xlsx

PREAMBLE TO IR (IF ANY):

QUESTION:

- a) Can Manitoba Hydro confirm that the directly assigned export costs, defined in cell “D84” includes Midcontinent Independent System Operator (“MISO”) fees, National Energy Board (“NEB”) fees and export-related water rental charges?
- b) Can Manitoba Hydro confirm that the directly assigned export costs exclude the Uniform Rate Adjustment policy charge?
- c) Can Manitoba Hydro provide the breakdown of directly assigned export costs into the components listed in part 1, as well as any others?

RATIONALE FOR QUESTION:

To confirm GSS/GSM’s understanding of the model.

RESPONSE:

- a) Cell D84 contains a label. Manitoba Hydro believes the question is referring to costs in cells F84 and G84. If so, please see Manitoba Hydro’s response to PUB/MH I-158 for details of the costs included in cell G84. Cell F84 includes the \$449,000 amortization of the Affordable Energy Fund.

As directed in PUB Order 164/16, the cost of MISO and NEB fees are not assigned to Exports in PCOSS18.

- b) Confirmed. Consistent with the direction in PUB Order 164/16 that the cost of the Uniform Rate Adjustment should not be charged against Exports, the revenue adjustment has not been made in PCOSS18.
- c) Please see response to part (a) of this question.

REFERENCE:

Rudimentary Model of PCOSS18.xlsx

PREAMBLE TO IR (IF ANY):

QUESTION:

Similar to the schedule provided on the “Reference Scenario RCC Summary” tab, can Manitoba Hydro provide a schedule of RCCs for all customer classes after each class’ allocated NER revenue is deducted from its total cost, i.e. Total Revenue/ (Total Cost – Allocated NER).

RATIONALE FOR QUESTION:

To clarify the magnitude of rate balancing forgone in Manitoba Hydro’s Application.

RESPONSE:

Manitoba Hydro calculates the Revenue Cost Coverage for each customer class by adding class revenues to the classes’ share of Net Export Revenues and then dividing those combined revenues by the allocated cost for the class. This methodology has been utilized by Manitoba Hydro in each of its cost of service studies since 1979.

The following table provides the results of PCOSS18 produced by applying Net Export Revenues as a cost reduction in the Revenue Cost Coverage ratio calculation instead of as an addition to Class Revenue as discussed above.

While the alternative approach suggested in this question is plausible, that method generates results with a much broader set of RCC outcomes (93.5 to 115.7) when compared to the current method (94.8 to 112.5). The difference between the two methods is significant but will decrease as RCCs approach unity.

The difference in results that occurs using two reasonable approaches illustrates the impact that judgment can have on the results of the study, and the need to use a Zone of Reasonableness when applying the results of the PCOSS.

	(a) Total Cost (\$000)	(b) Class Revenue (\$000)	(c) Net Export Revenue (\$000)	PCOSS18 RCC (b+c)/a	Alternate RCC b/(a-c)	RCC Change
Residential	810,916	607,106	161,911	94.8%	93.5%	-1.3%
GSS Non Demand	151,814	139,479	31,313	112.5%	115.7%	3.2%
GSS Demand	185,200	146,983	40,099	101.0%	101.3%	0.3%
GSM	253,466	191,737	57,472	98.3%	97.8%	-0.5%
GSL 0-30 kV	120,404	89,652	29,613	99.1%	98.7%	-0.4%
GSL 30-100 kV	86,975	69,995	25,054	109.3%	113.0%	3.7%
GSL >100 kV	230,688	180,458	70,042	108.6%	112.3%	3.7%
A&RL	22,987	21,571	1,482	100.3%	100.3%	0.0%