Nalcor Energy Marketing

Presentation to the Régie de l'énergie du Québec (the "Régie")

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February 26, 2019

DEMANDE DU TRANSPORTEUR RELATIVE À LA CONSTRUCTION D'UNE LIGNE DE 735 KV ENTRE LES POSTES MICOUA ET DU SAGUENAY

(THE "MICOUA-SAGUENAY LINE")

Régie's file: R-4052-2018

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Presentation plan

- Preliminary remarks
- Regulatory framework
- The Micoua-Saguenay Line drivers
- Economic analysis
- Concluding remarks and recommendations

* The Manic-Québec corridor transfer capacity limit vs system design requirements to be presented in a closed session

Preliminary remarks

- NEMC is an active Hydro-Québec TransÉnergie ("**HQT**") point to point client
- NEMC is an active energy marketer on several electricity markets
- NEMC is concerned by the impact of the proposed investment on the transmission rates and the quality of the electricity transmission services
- NEMC's main objective:
  - Ensure that the proposed investment project meets the Québec regulatory principles and good utility practice, but with a minimum potential impact on rates

Regulatory framework

General principles

- Investment files are notably governed by:
  - Section 73 of the *Act respecting the Régie de l'énergie* (the "**Act**")
  - Sections 1, 2 and 5 of the *Regulation respecting the conditions and cases where authorization is required from the Régie de l'énergie* (the "**Regulation**")
- Régie's authorization is required to acquire and construct assets as part of an electric power transmission project worth $25 million or more
- HQT must provide information pertaining to the potential impact of such an investment project on rates
- The costs associated with the investment project will be integrated in the rate base in future rate case hearings

Additional principles to consider in network upgrades files

- Importance of:
  - protecting the existing clients from excessive network upgrades resulting from new electricity transmission service requests and the impact of retirements of generation resources
  - protecting the existing clients from potential undue discrimination that could result from a network upgrade (all clients shall be treated on a same level playing field regarding network upgrades)
  - having an open and transparent system planning process to ensure that HQT does not plan its system in order to favor its affiliates and to ensure a fair treatment for all[1]
- Various regulatory tools: notably HQT's *Open Access Transmission Tariff* (Appendix J and K (transmission planning sessions))[2]
- The cost-causation principle:
  - Determination of the causes, justifications and objectives of the proposed Micoua-Saguenay Line

(1): D-2015-209, para. 76 and 83.
(2): D-2012-010, paras. 303 and 304.

Micoua-Saguenay Line drivers

The main drivers according to NEMC

- Outside the control of all customers:
  - the lower load in the Côte-Nord region
- Due to Hydro-Québec Production's ("**HQP**") actions:
  - the closure of Tracy, La Citière and Gentilly-2 power plants have degraded the system reliability on the Manic-Québec corridor
  - the system needs to fully integrate the capacity of the hydroelectric complex 3 and 4 on the Rivière Romaine ("**La Romaine 3 and 4**")[3]

Who should ultimately bear the cost of the proposed Micoua-Saguenay Line due to those reasons?

(3): HQT-1, Document 1, page 8, lines 13 to17; HQT 2, Document 1.1, page 18, lines 8 to 10.

Manic-Québec corridor’s history

Valuable background history for this investment file

- HQT's system evolved from a 315 kV network in the 1950's to a high voltage 735 kV network in the beginning of 1965
- The need for the extra high voltage at 735 kV was driven by stability studies
- Hydro-Québec's stability issues at that time:
  - Traditional transient (first swing) instability issue
  - Dynamic (multi-swing) instability oscillations of the hydroelectric generators in the Côte-Nord region against the system in the south
  - Reduced operational flexibility by voltage and frequency fluctuations caused by switching operations on the transmission lines
- Researchers were looking at the use of power system stabilizers to damp low frequency oscillations of voltage and power angle and there was hope based on studies that synchronized condensers could possibly solve the reduced operational flexibility issue

Valuable background history for this investment file *(cont.)*

- Original design for the integration of Churchill Falls included three (3) additional lines in the Manic-Québec corridor:

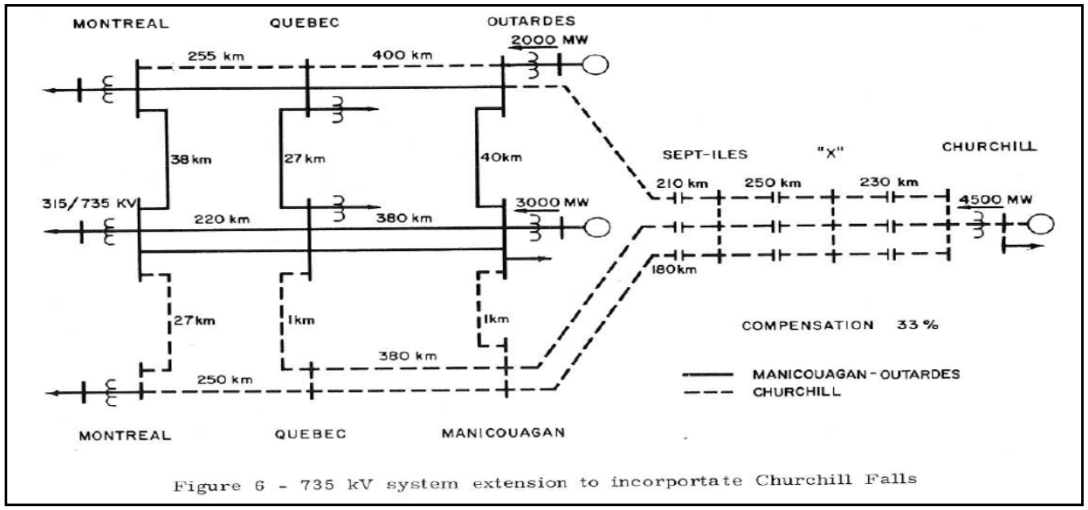


Figure 6 - 735 kV system extension to incorporate Churchill Falls

- Three (3) lines were constructed to connect Churchill Falls to Manicouagan/Outardes
- Two (2) lines were constructed between Manicouagan/Outardes and Québec, rather than three (the addition of power stabilizers, synchronous condensers and series compensation reduced the need for one 735 kV transmission line)
- Little has changed since as the Manic-Québec corridor continues to be made up of five (5) 735 kV lines

Hydro-Québec's development since Churchill Falls

- Gentilly-2 nuclear power plant in the south added damping and improved dynamic stability
- Development of the James Bay projects and many interconnections
- Major power outages in the 1980's created a need to re-assess system design and planning criteria
- Multiple lines of defence were developed[4] and the two most relevant to this file are:
  - **N-1 criteria:** frequent events are to be recovered from with no loss of load without any special protection systems ("SPS")
  - **N-1-1,500 criteria:** rare events can utilize SPS and will have fast recovery for partial outages if they occur

Hydro-Québec's research and development initiatives

- The Institut de recherche en électricité du Québec ("**IREQ**") was created by Hydro-Québec in 1967
- Fifty (50) years of research has focused on optimization of HQT's system through improvement of power stabilizers, improved detection of eminent instability and optimal tuning of control equipment
- A sampling of the work on power stabilizers to improve transient and dynamic stability up to 2010 is provided in NEMC's amended evidence (see Appendix B)
- HQT and the IREQ have been recognized globally through their work on power system dynamics

- HQT has **considerable knowledge and experience** with the unique reliability challenges in the Manic-Québec corridor
- HQT would have **recognized the potential for reliability issues** when Tracy, La Citière and Gentilly-2 power plants closed in 2011 and 2012
- When the load forecast dropped in the Côte-Nord region in 2013, HQT would have **immediately recognized the problem**

Chronology of events since 2010

Chronology of events since 2010

- **February 2011:** HQT filed an application for the integration of the 1,550 MW hydroelectric complex on the Rivière Romaine (the "**Romaine Project**"):
  - Based on a system impact study ("**SIS**") conducted in 2004
  - HQT stated that the Romaine Project would meet all reliability criteria, would have **no rate impact and would have no impact on transfer capacity limits**[5]
- **March 2011:** the 660 MW Tracy thermal power plant is retired and it removed a significant amount of stabilizing inertia energy and voltage support from the southern system of HQT
- **June 2011:** the Régie approved the Romaine Project subject to annual filing updates on its progress
- **2012:**
  - **March 2012:** the 308 MW La Citière combustion turbine power plant was retired
  - **December 2012:** the 675 MW Gentilly-2 nuclear power plant was retired
  - Both retirements removed stabilizing inertia and voltage support from the southern system of HQT

(5): R-3757-2011, HQT-1, Document 1 (Revised, May 6, 2011) (Exhibit B-0019), page 52, lines 3 and 4, page 53, lines 10 to 12 and page 54, lines 1 to 6.

Chronology of events since 2010 *(cont.)*

- **2013:** there is a major reduction in the load forecast for the Côte-Nord region for 2020/2021 and beyond

Tableau 9
Évolution de la prévision* de la demande d'électricité sur la Côte-Nord

Date d'émission de la prévision	Pointe de l'hiver 2020-2021		Pointe de l'hiver 2030-2031***	
	Total (MW)	Écart (MW)**	Total (MW)	Écart (MW)**
2010	3296	0	3302	0
2011	3206	-89	3213	-89
2012	2988	-308	3010	-291
2013	2355	-940	2422	-879
2014	2707	-588	2858	-443
2015	2196	-1100	2276	-1026
2016	2205	-1091	2249	-1052
2017	2318	-978	2372	-930
2018	2452	-844	2442	-860

* Prévision annuelle du Distributeur.

** Écart avec la prévision émise en 2010.

*** Valeurs de l'hiver 2030-2031 extrapolées à partir des prévisions du Distributeur

(6): HQT-2, Document 1.1 révisé, p. 15.

Chronology of events since 2010 *(cont.)*

- **2014:**
  - The $1,135 million Chamouchouane-Boût-de-l'Île line is partly justified to integrate the Romaine Project[7]
  - The permanent closure of the Tracy power plant was used by HQT to justify an investment of $44 million at the Bout-de-l'Île substation[8]
- The reduction of the industrial load in the Côte-Nord region had two (2) impacts on the Manic-Québec corridor:
  - It increased the amount of generation expected to transit via the Manic-Québec corridor
  - It lowered the amount of stabilizing inertia energy available in the Côte-Nord region
  - Both impacts added downward pressure on the transfer capacity limit of the Manic-Québec corridor

(7): R-3887-2014.
(8): R-3890-2014.

Chronology of events since 2010 *(cont.)*

- **2011, 2014 and 2017:** Comprehensive Reviews of Resource Adequacy for the Québec Balancing Authority Area were filed with the Northeast Power Coordinating Council (the "**NPCC**"):
  - Transfer capacity limits for the Manic-Québec corridor varied from a low of 11,750 MW to a high of 13,200 MW and settled back to the current value of 12,500 MW
  - The Churchill Falls-Manic corridor has remained constant at 5,200 MW
- **December 2015:** HQT portion of the Northern Pass project was filed with the Régie[9]
- **October 2017:** HQP filed the 440 MW Sainte-Marguerite project with HQT for a SIS
- **July 2018:** the Micoua-Saguenay Line project is filed before the Régie
- **February 2019:** The governor of Maine publicly supports the construction of a transmission line through Maine to deliver power from Québec to Massachusetts

(9): R-3956-2015.

HQT's rationale for the Micoua-Saguenay Line

HQT's rationale for the Micoua-Saguenay Line

- HQT's system in 2020/2021 does not meet the N-1-1,500 system design criteria required by the NPCC in its Directory 1 and by the Régie in the reliability standard TPL-001-4
- The problem is that the Manic-Québec transfer capacity limit is not sufficient for three reasons:
  - The closure of the Tracy, La Citière and Gentilly-2 power plants
  - The lower load forecast in the Côte-Nord region
  - The integration of the Romaine Project, especially La Romaine 3 and 4
- According to HQT, the Micoua-Saguenay Line is claimed to be the least expensive of three (3) possible solutions

Analysis of the Manic-Québec corridor transfer capacities

- NEMC has completed an analysis of operation of the Manic-Québec corridor using the HQD load forecast for 2020-2021, the Côte-Nord transmission losses on the 735 kV system and the transfer capacities provided in the Resource Adequacy reviews provided by Hydro-Québec to the NPCC

	Côte-Nord Region			Manic-Québec Corridor		
Forecast Year	Generation in 2020-21	Load in 2020-21	Transmission Losses	Delivered at Quebec	Transfer Capacity	Surplus (Deficit)
2010	15,400	3,296	500	11,604	12,900	1296
2011	15,400	3,206	500	11,694	12,900	1206
2012	15,400	2,988	500	11,912	12,900	988
2013	15,400	2,355	500	12,545	12,900	**355**
2014	15,400	2,707	500	12,193	13,200	**1007**
2015	15,400	2,196	500	12,704	13,200	**496**
2016	15,400	2,205	500	12,695	13,200	**505**
2017	15,400	2,318	500	12,582	12,500	**-82**

- Small deficit in 2020/2021 for the 2017 forecast year
- Transfer capacities from 2012 to 2016 were incorrect. They assumed transmission upgrades that did not occur. Transfer capacities would have been **only 12,500 MW or lower**

Analysis of the Manic-Québec corridor transfer capacities *(cont.)*

- Redoing the analysis by reducing the transfer capacity to 12,500 MW

	Côte-Nord Region			Manic-Québec Corridor		
Forecast Year	Generation in 2020-21	Load in 2020-21	Transmission Losses	Delivered at Quebec	Transfer Capacity	Surplus (Deficit)
2010	15,400	3,296	500	11,604	12,900	1296
2011	15,400	3,206	500	11,694	12,500	806
2012	15,400	2,988	500	11,912	12,500	588
2013	15,400	2,355	500	12,545	12,500	-45
2014	15,400	2,707	500	12,193	12,500	307
2015	15,400	2,196	500	12,704	12,500	-204
2016	15,400	2,205	500	12,695	12,500	-195
2017	15,400	2,318	500	12,582	12,500	-82

- Deficits begin as early as 2013 **assuming that the transfer capacity of 12,500 MW is actually achievable** in the existing system

Analysis of the Manic-Québec corridor transfer capacities *(cont.)*

- Studies confirmed the problem in 2013/2014, but HQT took to 2016 to finalize the solution

  "Le Transporteur a réalisé plusieurs études depuis 2013 qui permettent d'identifier les besoins liés au Projet. L'étude de planification dont les hypothèses sont les plus à jour a été réalisée en 2016."[9]

  " Pour le Projet, la première analyse a été réalisée en 2014 et a permis de recommander le début de la phase avant-projet de la solution 1 [Micoua-Saguenay Line]*, retenue en novembre 2014."*[10]

- Meanwhile, HQD reported in 2014 to the NPCC a transfer capacity of 13,200 MW for 2018/2019:
  - HQT assumed a solution would be approved by the Régie even though the Régie was not directly informed of the problem[11]
- HQT proceeded with the Micoua-Saguenay Line **without notifying the Régie of the material changes to its system** since the approval of the Romaine Project

(9): HQT-2, Document 1.1, page 5, lines 25 to 27.
(10): HQT-1, Document 1, page 22, lines 8 to 10.
(11): HQT-3, Document 5, R.2.2, page 12.

Analysis of the Manic-Québec corridor transfer capacities *(cont.)*

- If La Romaine 3 and 4 had been delayed, the Côte-Nord generation would have been reduced by 640 MW and the cost of the transmission line to Montagnais would have been avoided
- Assuming that the transfer capacity of 12,500 MW is actually achievable in the existing system and with the removal of La Romaine 3 and 4, the transfer capacities are

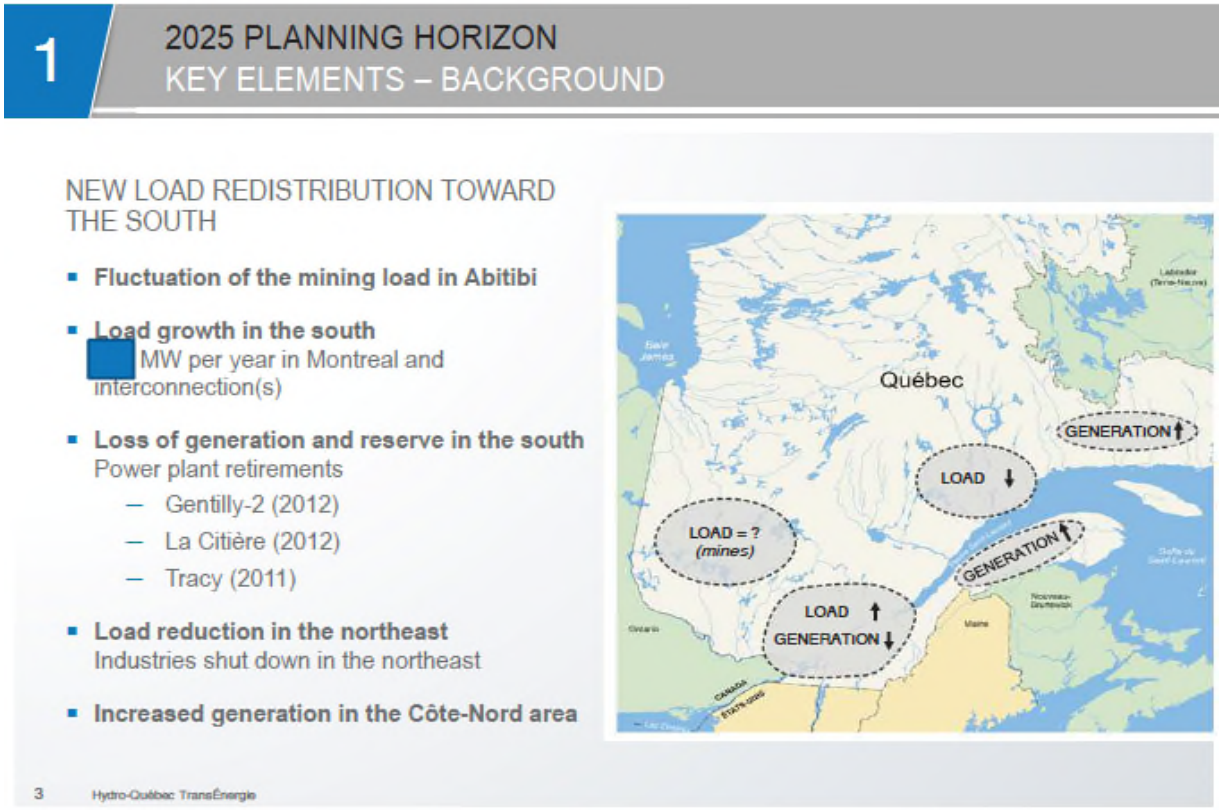
	Côte-Nord Region			Manic-Québec Corridor		
Forecast Year	Generation in 2020-21	Load in 2020-21	Transmission Losses	Delivered at Quebec	Transfer Capacity	Surplus (Deficit)
2010	14,760	3,296	500	10,964	12,900	1936
2011	14,760	3,206	500	11,054	12,500	1446
2012	14,760	2,988	500	11,272	12,500	1228
2013	14,760	2,355	500	11,905	12,500	595
2014	14,760	2,707	500	11,553	12,500	947
2015	14,760	2,196	500	12,064	12,500	436
2016	14,760	2,205	500	12,055	12,500	445
2017	14,760	2,318	500	11,942	12,500	558

- The analysis shows that it was clear in 2013 that there were issues with the integration of La Romaine 3 and 4. **HQT should have informed the Régie and revisited its integration requirements of La Romaine 3 and 4**

Impact of more generation in the Côte-Nord region

Romaine Project and the need for the Micoua-Saguenay Line

- In 2015, HQT justified the need of the Micoua-Saguenay Line by:
  - The lost of load in the Côte-Nord region
  - The increase of generation (Romaine Project)[12]



(12): Schedule K meeting of November 13, 2015.

Romaine Project and the need for the Micoua-Saguenay Line

- The need for additional transmission capacity would have been reduced by 640 MW without the integration of La Romaine 3 and 4
- On December 31, 2013 (thus after HQT had received the lower demand forecast for the Côte-Nord region), the interconnection work of La Romaine 3 and 4 were at the initial stage and could thus have been delayed

Generation connection costs for the Romaine Project

Key findings from the Romaine Project

- $1,730 million investment project:
  - $1,330 million for the interconnection of the power plants to the existing network
  - $400 million for upgrades on the main transmission system
- Three (3) options were considered for the economic analysis in the R-3757-2011 proceedings:
  - Solution 1: series compensation (preferred option)
  - Solution 2: new 750 km 1,000 MW HVDC transmission line
  - Solution 3: two (2) scenarios involving one or two underwater cables between the Côte-Nord region and the southern portion of HQT's system
- Contrary to the Chamouchouane-Bout-de-l'Île and the Micoua-Saguenay Line, for which the cost is to be socialized among all clients, the economic analysis in the Romaine Project did

	R-4052-2018 (Micoua-Saguenay)			R-3557-2011 (Romaine)		R-3887-2014 (Chamouchouane-Bout-de-l'île)	
	Solution 1: Micoua-Saguenay line	Solution 2: Outardes-Laurentides line	Solution 1: Series compensations	Solution 1: Series compensation	Solution 2: 1000 MW HVDC line	Solution 1: 735 kV line	Solution 2: series Compensation1000 MW HVDC line
Total cost excluding losses	$ 563.2 M	$ 898.5 M	**$ 290.9 M**	**$ 396 M**	$ 950 M	$ 699.9 M	**$ 578.6 M**
Losses (only available in the R-4052-2018 docket)	$ 268.5 M	$ 0 M	$ 602.6 M	$? M	$ 0 M	$ 0 M	$ 873.7M
Total Cost including losses	**$831.7 M**	$898.5 M	$893.5 M	$? M	**$950 M**	**$ 699M**	$1,450 M

Key findings from the Romaine Project *(cont.)*

- The series compensation option was then considered as the most cost-effective solution and therefore approved by the Régie
- Apart from the Outardes new substation, most of the main system approved investment by the Régie in the R-3757-2011 proceedings was replaced by the Chamouchouane-Bout-de-l'Île project in 2014
- The system conditions (loss of generation in the south and load decrease in the Côte-Nord region) used to justify the Micoua-Saguenay Line in the current proceeding were known to HQT in 2014 when they filed the request for the Chamouchouane-Bout-de l'Île
- The Chamouchouane-Bout-de-l'Île project was not sufficient to integrate the Romaine Project under the new system conditions

Economic analysis

Criticism of HQT's economic analysis[13]

Tableau 4
Comparaison économique des solutions
(M$ actualisés 2018)

	Solution 1 Nouvelle ligne à 735 kV Micoua-Saguenay	**Solution 2** Nouvelle ligne à 735 kV Outardes-Laurentides	**Solution 3** Compensation série dans le corridor Manic-Québec
Investissements	585,7	929,0	277,5
Valeurs résiduelles	-67,9	-102,0	-2,7
Taxe sur les services publics	45,4	71,5	16,1
Charges d'exploitation Pertes électriques	222,6	____	571,4
Coûts globaux actualisés (CGA)	**785,7**	**898,5**	**862,3**

- NEMC's issues regarding HQT's economic analysis:
  - The loss factor used is too high
  - The energy cost of the transmission losses is too high
  - The capacity cost of losses is too high

(13): The details of the economic analysis and the parameters used by HQT are presented in Schedule 5 of HQT-1, Document 1 (B-0005) (Schedule 5 was filed by HQT as Exhibit B-0007).

The loss factor used by HQT is too high

- The loss factor (F_P) is calculated from the load factor (F_C):
  - $F_P = 0.9 \times F_C^2 + 0.1 \times F_C$
- F_P is too high because F_C is too high:
  - HQT's $F_C = 0.70$ in this file produces a $F_P = 0.511$
  - NEMC originally determined $F_C = 0.6729$ and a $F_P = 0.4749$
  - HQT used $F_C = 0.591$ in file R-4058-2018
  - $F_C = 0.591$ should be used which would produce $F_P = 0.37345$

The loss factor used by HQT is too high *(cont.)*

- The annual peak and energy data provided in the 2017 Annual Report of Hydro-Québec for the last five (5) indicate that the average load factor (F_C) is rather 0.6732 and the average loss factor (F_P) over the five (5) years would be 0.4749

	Determination of HQ Historical Load and Loss Factors					
	2017/18	**2016/17**	**2015/16**	**2014/15**	**2013/14**	**Average**
HQ 2017 Annual Report[1]						
Peak Load (MW)	38,204	36,797	37,347	38,743	39,031	38,024
Energy (GWh)	226,824	223,143	222,172	222,045	226,576	224,152
Calculated Values						
Load Factor (F_C)[2]	0.6778	0.6923	0.6791	0.6542	0.6627	0.6729
Loss Factor (F_P)[3]	0.4812	0.5005	0.4830	0.4507	0.4615	**0.4749**
Where:						
1	Peak and energy data from **Operating Statistics Table,** page 77, **HQ 2017 Annual Report**					
2	Load Factor (F_C) = Total energy (GWh) /(Peak Load (GW) x 8,760 hrs)					
3	Loss Factor (F_P) = $0.9xF_C^2 + 0.1xF_C$ (from HQT-2, Document 1.1, page 17, line 16)					

- Now this is considered as a sensitivity case

The loss factor used by HQT is too high *(cont.)*

- The effect of lowering the F_P in the economic analysis is to lower the amount of energy losses
- This will lower the cost of losses in each solution
- The greatest reduction will be in the series compensation option because it has the highest capacity losses

The energy cost of the transmissions losses is too high

- The cost of the transmission losses used by HQT in its economic analysis were based on "*la valeur des coûts évités en puissance et en énergie du Distributeur*"[14]

Costs of Losses	2023	2024	2025	2026	2027	2028	2029	...
Energy Rate ($/MWh)	46	47	48	48	49	108	110	...
Capacity Rate ($/MW-yr)	22965	23424	23893	131695	134329	137015	139756	...
Escallation		2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	...

- NEMC disagrees with the use of HQD's avoided costs for this analysis:
  - They are not avoided costs for HQT, they are simply internal transfers within Hydro-Québec
- The cost of differential losses for the solution options is the lost opportunity of HQP to gain export revenue from external markets
- System losses are incremental to supply of loads and are similar to negative energy imbalances which cause an incremental increase in generation
- Using the lost export market revenue is consistent with the manner by which HQT settles energy imbalance in Schedule 4 of HQT's OATT
- The Régie ordered that the energy imbalance be based on hourly market prices[15]
- NEMC believes that using forecast day ahead ISO NE prices are appropriate (actual hourly costs may be lower)

(14): HQT-2, Document 1.1, p. 20, line 1.

(15): D-2009-015, page 111.

The capacity cost of the transmission losses is too high

- Value of capacity is not HQD's avoided cost, but HQP's opportunity to sell it in markets
- For the short term (2023-2025), the opportunity is the ISO-NE Forward Capacity Market:
  - HQP is selling 442 MW at $US 3.70/kW-month for 2021-2022
- For the longer term, the escalating cost of a combustion turbine ("CT") is recognized as appropriate:
  - It allows for comparison of capital projects with differing lives
  - It is the deferral value of the CT
  - It is regularly applied in long term planning studies
  - A CT is the lowest cost form of new capacity
- The resulting capacity value for 2026 and beyond in the economic analysis should be $CD 101,977.07/MW-year escalating at 2%:
  - Data used:
    - NB Power CT costs accepted by NB Energy and Utilities Board (2018 Matter 415)
    - Finance costs and 2% escalation are the same as HQT analysis
    - Detailed calculation is provided in Table 9 of NEMC's amended evidence

Updated economic analysis

	NEMC Modelling Summary Results ($000)					
	HQT Base Case		Revised HQT Base Case		Revised NEMC Update	
	Mic-Sag Line	Series Comp	Mic-Sag Line	Series Comp	Mic-Sag Line	Series Comp
Investment	571,790	248,548	571,790	248,548	571,790	248,548
Reinvestment	13,886	28,948	13,886	28,948	13,886	28,948
Residual	67,883	2,744	67,883	2,744	67,883	2,744
Taxes	45,329	16,205	45,329	16,205	45,329	16,205
Losses	222,598	451,794	177,053	451,794	**118,629**	**302,426**
NEMC Total	785,721	862,367	740,176	742,751	**681,752**	**593,384**
HQT Total	785,748	862,308				
Differential Cost		76,560		2,575	**88,369**	
Assumptions						
Loss Factor	0.511		0.37345		0.37345	
Energy cost ($/MWh)	45.8 in 2023 esc @ 2.0%		45.8 in 2023 esc @ 2.0%		PIRA/Platts to 2040 less $6 then 2%	
	107.75 in 2028 esc @ 2.0%		107.75 in 2028 esc @ 2.0%		42.2 in 2023 to 77.0 in 2040 then 2% esc	
Capacity ($/kW-yr)	$22.97/kW-yr in 2023-2025		$22.97/kW-yr in 2023-2025		$55.5/kW-yr in 2023-2025	
from 2026	131.7kW-yr esc @ 2%		131.7kW-yr esc @ 2%		$101.98/kW-yr esc @ 2%	

Sensitivity analysis

- Series compensation is less expensive for all solutions

NEMC Economic Update and Sensitivity Results ($000)			
	Series Comp	Mic-Sag Line	Differential
Updated Analysis	593,384	681,752	88,369
Sensitivities			
Loss Factor = 0.32725	568,787	672,497	103,710
Loss capacity 5% less	577,706	681,532	103,826
Energy price 5% less	582,886	677,802	94,916
Exchange rate = $0. 75US	606,532	686,640	80,108
Loss factor = 0.47486	642,897	700,388	57,491

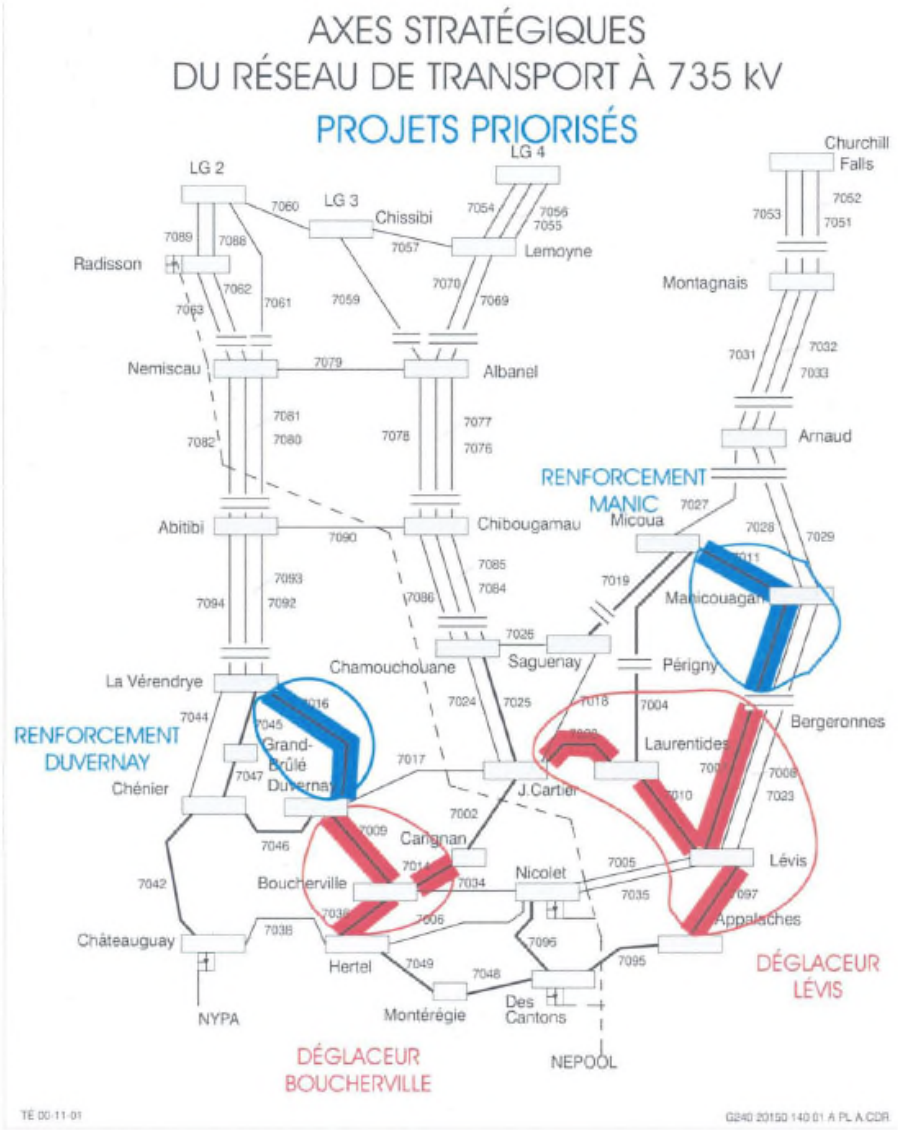
Series compensation requirements

- The two (2) transmission line options provide blocks of increased transfer capacity while series compensation provides incremental transfer capacity dependent on the amount added
- What is the transfer capacity of the series compensation option?
  - What is the minimum amount needed to meet the N-1-1,500 criteria?
  - Is it equal to the transfer capacity of the Micoua-Saguenay Line, or to the Outardes-Laurentides project?
- Any differences in the operational performance of the options (other than system losses) should be considered in the economic evaluation
- In its responses to NEMC's IRs #2, HQT:
  - Did not provide the transfer capacity of any of the three (3) options
  - Did not acknowledge the incremental nature of the series compensation option
  - Did not consider that increased load in the Côte-Nord region would be supplied by regional generation, which would reduce the amount of generation to be transferred

Costs associated with the ice storm reliability criteria

- In its complementary evidence, HQT mentioned that the economic analysis of the series compensation option should consider an additional investment of $279.2 million to meet the new ice storm protection strategy
- The ice storm criteria should not be considered by the Régie in the economic analysis for the following reasons:
  - In the proceedings on the de-icing device at the Lévis substation (R-3522-2003), HQT stated that no investment was needed in the northeast region and that the focus should be on the high load areas of Montréal and Québec City
  - In the event that investment should become needed in the northeast region, the required investment should be on the Micoua-Manicouagan and Manicouagan-Bergeronne paths, not the Micoua-Saguenay path
  - Those criteria were not considered in the proposed investment (series compensation option) to integrate the Romaine power plants (R-3757-2011)

Figure 1 – Projets identifiés pour l'amélioration de la sécurité du réseau face au verglas



Concluding remarks and recommendations

NEMC's concluding remarks and recommendations

- Due to the combination of decreasing load and increasing generation, NEMC recognizes the need for investment in the Manic-Québec corridor
- NEMC believes that the lowest-cost solution to solve the reliability issue is the series compensation solution:
  - It is the most economic solution:
    - It is by far the lowest capital cost solution which will have less impact on rates
  - It is the most flexible option:
    - Any load growth in the Côte-Nord region would reduce the scale of the series compensation option
    - Future generation integration requests would trigger the Micoua-Saguenay Line, which would replace the series compensation investment and better allocate costs of such investments, while meeting the reliability and network integration needs
- Important drivers for the Micoua-Saguenay Line are changes in the production profile of HQP (closure of three (3) southern power plants and the integration of La Romaine 3 and 4 knowing that the Côte-Nord region load was decreasing)
- NEMC believes that the cost-causation and rate neutrality principles will have to be carefully considered in the rate case hearing to integrate the investment in the rate base
- Is it solely a project falling under the investment category "Maintien et amélioration de la qualité de service"?

Teamwork

Sharing our ideas in an open and supportive manner to achieve excellence.

Open Communication

Fostering an environment where information moves freely in a timely manner.

Honesty and Trust

Being sincere in everything we say and do.

Safety

Relentless commitment to protecting ourselves, our colleagues, and our community.

Respect and Dignity

Appreciating the individuality of others by our words and actions.

Leadership

Empowering individuals to help, guide and inspire others.

Accountability

Holding ourselves responsible for our actions and performance.

A proud, diverse energy company, whose people are committed to building a bright future for Newfoundland and Labrador, unified by our core values.