

# **MRI for Hydro-Québec Transmission**

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Régie de l'énergie

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## **Introduction**

Québec's Régie de l'Énergie is developing a *mécanisme de réglementation incitative* ("MRI") for Hydro-Québec Transmission ("HQT")

This presentation discusses the characteristics Pacific Economics Group recommends for HQT based on our evidence in this proceeding



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## ***Introduction (cont'd)***

The presentation takes account of the Régie's decision in D-2017-043 on characteristics of an MRI for HQ Distribution.

An MRI for HQT will likely *include*

- Revenue cap index
- X factor based on Régie's judgement (no "Phase 2")
- Québec-specific inflation measure
- MTER (earnings sharing)
- Clause de sortie ("Off ramp")
- Performance incentive mechanisms
- 4 year term

The MRI will likely *exclude*

- Marketing flexibility
- Efficiency carryover mechanism
- Price caps for industrial customers

## ***Introduction (cont'd)***

Presentation focusses on three *outstanding* issues

Should the revenue cap apply to capital cost?

If so, how should it be designed?

HQT's proposed adjustment factors

Several statements made yesterday by HQT and its experts will be challenged

## Summary of Recommendations



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## Summary of PEG's Recommendations

HQT	
Basic Approach to Incentive Regulation	Multi-year rate plan
Revenue Caps or Price Caps	Revenue caps
Application	Of the: Amortization, Depreciation, Return on Rate Base
Relaxing the Revenue/Usage Link	Revenue decoupling
Attention Relief Mechanism	Performance or hybrid
Phase 2 Studies	Efficiency & Benchmarking
Eff Factors	Limited Capital Expenditures & RPMs Indexed
Eff Factors	Yes
Efficiency Carryover Mechanism	Yes
Performance Incentive Mechanism	Reliability Safety Customer Service Investment
Earnings Sharing Mechanism	Yes
Off Ramps	Yes
Marketing Flexibility	Yes
Plan Term	4 years

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## *Outstanding Issues*



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### *HQT's Revenue Cap Should Apply to Capital*

Article 48.1 requires improved HQT performance and streamlined regulation.

HQT's proposed COS treatment of capital cost would not satisfy these goals

Performance incentives would be weak and regulatory cost would be high.

Very few precedents for HQT's proposed approach

Vermont is abandoning it

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## HQT's Revenue Cap Should Apply to Capital

- Trajectory of total cost is what matters
- Capital intensiveness isn't *that* much higher for transmission than for distribution
- Capital cost growth is *more* stable than CNE growth (but it's more "sticky")
- Large size of HQT *stabilizes* its capital cost growth
- Multiyear* capex projects *reduce* capital cost volatility
- Capex is controllable
- Generators pay large share of HQT's system expansion costs
- No evidence that HQT's capital cost *trend* is unusual
- US energy utilities have proposed comprehensive indexing on many occasions
- Requests for extra capital revenue in Canada reflect special circumstances
  - "Echo effect" and rapid economic growth in Alberta
  - Extended rate freeze in Ontario
  - Strategic behavior by distributors
- Most Ontario power distributors have *not* requested extra capital revenue



### Revenus Requis of Hydro-Québec TransÉnergie<sup>1</sup>

Année	Base de Tarification		Amortissement		Dépenses <sup>2</sup>		Dépenses Totales <sup>1</sup>		Revenus Requis Total	
	Level	Growth Rate	Level	Growth Rate	Level	Growth Rate	Level	Growth Rate	Level	Growth Rate
2013	24,292		15		81		2,229		2,586	
2014	24,291	-0.04%	469	6.86%	768	-6.27%	1,217	2.17%	2,166	0.76%
2015	24,637	1.38%	468	0.21%	827	8.07%	1,292	6.18%	2,473	15.28%
2016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2017	24,521	1.86%	493	5.32%	899	8.82%	1,882	3.88%	2,643	2.52%
2018	24,799	1.12%	514	4.26%	927	3.12%	1,451	-2.97%	2,411	-0.87%
2019	18,989	-23.3%	519	0.97%	889	-4.86%	1,518	4.67%	2,435	2.65%
2020	15,424	-22.5%	452	-13.3%	797	-11.1%	1,487	-4.75%	2,334	-2.2%
2021	16,046	2.1%	781	19.8%	775	-1.5%	1,556	4.5%	2,828	21.2%
2022	16,444	2.5%	950	19.5%	788	1.6%	1,698	9.2%	2,993	6.0%
2023	16,875	2.6%	962	1.3%	778	-1.3%	1,736	2.2%	3,125	4.4%
2024	16,898	0.1%	995	3.3%	771	-0.8%	1,706	-1.7%	2,992	-4.3%
2025	17,227	1.9%	965	-3.0%	786	1.9%	1,751	2.6%	2,938	-1.8%
2026	17,591	2.1%	1,018	5.5%	853	8.6%	1,883	7.5%	3,229	9.8%
2027	18,428	4.8%	983	-3.5%	864	1.3%	1,966	4.4%	3,363	4.1%
2028	19,082	3.5%	1,038	5.6%	751	-14.8%	1,829	-7.2%	3,114	-7.4%
2029	19,862	4.1%	1,089	4.9%	854	13.7%	1,947	6.5%	3,297	5.7%
2030	20,442	2.9%	1,079	-0.9%	NA	NA	NA	NA	NA	NA
2031	21,723	6.3%	1,102	2.1%	NA	NA	NA	NA	NA	NA
2032	22,839	5.1%	1,120	1.6%	NA	NA	NA	NA	NA	NA
2033	22,513	-1.4%	1,129	0.8%	NA	NA	NA	NA	NA	NA
2034	22,799	1.3%	1,149	1.7%	NA	NA	NA	NA	NA	NA
<b>Annual growth rates:</b>										
2013-2014		1.1%		5.9%		0.8%		2.8%		1.5%
2014-2015		2.2%		6.8%		1.0%		2.8%		2.0%
2015-2022		1.5%		1.5%		NA		NA		NA
<b>20-year (2013-2032) average growth rates:</b>										
2013-2032		1.6%		4.6%		0.8%		3.4%		2.5%

<sup>1</sup> All amounts listed here are in millions of dollars. Due to missing data in 2014, growth rates for 2014 and 2015 are interpolated. Reported values are forecasts, not historical values.

<sup>2</sup> Depenses include all expenses except for amortissement in HQT's revenue requirement.

<sup>3</sup> Depenses totales (le requies) is the sum of Depenses Necessaires à la Prestation du Service (HQT's revenue requirement). This is the entire revenue requirement less the Trésorerie sur la Base de Liquidation.

Sources: For years 2013-2024, data are for HQT's revenue requirement (HQT's comp. price) filed to the Régie's rate case decisions. Historical data for 2017-2020 are from HQT's Document 1 (Rapports du Transporteur à la demande de renseignements numéro 1 de la Régie de l'énergie [R-Rep-1]), as are data for 2016, l'année de base 1, 2017 (l'année de révision), and 2018-2022 (projets).



### Historic Components of the Revenue Requis of HQD's Distributor Services<sup>1</sup>

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Année Year	Base de Tarification		Amortissement et Décaissement		Dépenses <sup>1</sup>		Dépenses Totales <sup>2</sup>		Service de Distribution Total	
	Level	Growth Rate	Level (\$)	Growth Rate	Level (\$)	Growth Rate	Level (\$)	Growth Rate	Level	Growth Rate
2004	8,319		447		1,202		1,649		2,270	
2005	8,447	1.53%	489	9.00%	1,244	3.64%	1,735	5.13%	2,370	4.34%
2006	8,875	4.94%	570	15.29%	1,306	4.69%	1,876	7.80%	2,505	5.53%
2007	9,413	5.89%	591	3.64%	1,364	4.33%	1,955	4.11%	2,727	8.87%
2008	9,861	4.65%	640	8.04%	1,408	3.20%	2,049	4.69%	2,859	4.74%
2009	9,741	1.22%	851	28.61%	1,374	2.47%	2,227	8.32%	3,032	5.88%
2010	9,990	2.52%	833	2.36%	1,440	4.72%	2,273	2.07%	3,187	4.97%
2011	10,306	3.11%	802	3.71%	1,407	2.35%	2,209	2.85%	3,052	-4.30%
2012	9,896	-4.06%	885	9.79%	1,403	-0.30%	2,288	3.48%	3,061	0.28%
2013	10,139	2.43%	773	-13.51%	1,471	4.78%	2,244	-1.90%	3,109	1.56%
2014	10,551	3.98%	817	5.58%	1,467	-0.29%	2,285	1.77%	3,144	1.13%
2015	10,590	0.38%	683	-17.95%	1,482	0.98%	2,165	-5.39%	2,917	-7.50%
2016	10,743	1.44%	645	-5.80%	1,388	-6.52%	2,033	-6.29%	2,693	-8.01%
2017	10,749	0.04%	906	34.02%	1,370	-1.31%	2,276	11.30%	3,017	11.39%
<b>Averages</b>										
2005-2014		2.38%		6.04%		1.99%		3.26%		3.26%
2011-2014		1.37%		-0.46%		0.46%		0.13%		-0.33%
<b>Standard deviations of growth rates</b>										
2011-2017		2.66%		17.45%		3.42%		6.10%		6.69%
2011-2016		2.87%		10.68%		3.74%		3.87%		4.37%

<sup>1</sup> All amounts listed here are in millions of dollars.

<sup>2</sup> Dépenses are defined as the revenue requirement for distributor services less "amortissement et décaissement" and the "rendement sur la base de tarification". They include "Charges d'exploitation", "achats de combustible", and taxes.

<sup>3</sup> Dépenses totales are equal to the revenue requirement for distributor services less the "rendement sur la base de tarification".

Regie's rate case decisions: Data for 2014 (année historique) is from HQD's 2016 rate case filing, while data for 2015 (année historique) and 2016 (année de base) are from HQD's most recent rate case filing. Data for 2017 are the values approved by the Regie for the 2017 test year as outlined in HQD's most recent rate case compliance filing.

Note: italicized values are forecasts, non-italic values are historical values.

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### Historical and Forecasted Capex of HQT<sup>1</sup>

Year	Catégories des investissements de HQT					Contributions et frais d'entretien	Total Investissements et contributions et frais d'entretien
	Ne générant pas des revenus additionnels	Général des revenus additionnels		Total			
2013	939		1,012		1,951.5	-58.0	1,893
2014	897	-4.7%	798	-23.8%	1,694.3	-14.1%	1,635
2015	922	2.8%	744	-7.0%	1,666.0	-1.7%	1,570
2016	1,159	22.8%	701	-5.9%	1,859.4	11.0%	1,575
2017	1,513	26.7%	852	19.5%	2,365.3	24.1%	2,319
2018	1,027	-32.2%	950	10.8%	2,046.2	-14.5%	1,774
2019	1,082	-1.3%	472	-70.0%	1,553.8	-27.5%	1,536
2020	1,047	-3.3%	388	-19.5%	1,435.5	-7.9%	461
2021	1,305	22.0%	231	-51.7%	1,535.9	6.8%	1,536
2022	1,397	6.8%	240	3.6%	1,636.8	6.4%	1,633
2023	1,347	-3.6%	309	25.4%	1,656.3	1.2%	1,656
2024	1,481	9.5%	383	21.4%	1,863.7	11.8%	1,864
2025	1,051	-34.3%	218	-56.2%	1,268.8	-38.4%	1,269
2026	1,051	0.0%	219	0.1%	1,269.0	0.0%	1,269
<b>Averages:</b>							
2013-2026	1,163	NA	537	NA	1,700	NA	1,571
2013-2015	919	NA	851	NA	1,771	NA	1,700
2014-2026	1,181	0.9%	500	-11.8%	1,681	-3.3%	1,546
2019-2022	1,208	6.1%	333	-34.4%	1,541	-5.6%	1,291

<sup>1</sup> All amounts listed here are in millions of dollars. Italicized values are forecasts.

Sources: Table 9, HQT-9, Doc. 1 (R-3903-2014, pg. 29, R-3934-2015, pg. 30, R-3981-2016, pg. 30). 2013-2015 are "réel," 2016 "budget," and 2017-2026 "planifié."

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## Revenue Cap Should Apply to Capital (cont'd)

Various plan provisions reduce capital cost risk

- Inflation index
- C factor
- MTER
- Off ramp
- Z factor for capital cost impact of severe storms, various mandates
- 4 year term
- PEG proposed several ways of providing extra capital revenue if Regie approves a comprehensive indexed revenue cap

HQT can manage its affairs to reduce risk

- Reduce capex [e.g. via HQT's modele de gestions des actifs (MGA)]
- Reduce CNE
- Retain earnings to fund future capex surges
- Try not to "bunch" capex

## No Precedent for Transmission MRIs

Hydro One Networks has considered MRI for transmission and has been mandated by Ontario Energy Board to propose one

Several vertically integrated Canadian utilities have operated under MRIs that include transmission

Others have never been subject to *any* kind of MRI  
(e.g. BC Hydro, Manitoba Hydro, ...)

FERC uses "formula rate" approach to power transmission

In years past, US transmission utilities operated for many years without rate cases

MRIs common for transmission *overseas* (e.g. Australia, Great Britain)





## Facteur de Croissance (C Factor)

Multiple dimensions of operating scale drive transmission cost

- Generation capacity
- Line km
- Peak demand
- Export and import capacity

>>> C could be growth in multidimensional scale index

However, using peak demand growth as C weakens HQ's incentive to contain peak

Number of retail customers...

- highly correlated with peak demand
- doesn't weaken peak load management incentive

## C Factor (cont'd)

PEG developed illustrative transmission scale index for a comprehensive revenue cap escalator

Weights based on results of econometric total transmission cost model

Growth Scale = 0.54 x growth Line Km +  
 0.19 x growth Generation Capacity +  
 0.36 x growth Retail Customers

## X Factor

$$X = \text{Base Productivity Trend} + \text{Stretch Factor}$$

### Stretch Factor

Stretch factors in Canada typically lie in the [0.00-0.60] range

0.60	Poor cost performer
0.20-0.30	Average cost performer
0.00	Superior cost performer

HQT's balisage (benchmarking) studies are relevant only to *this* X factor term

>>> Balisage evidence is insufficient basis for setting X

### Base Productivity Trend

Not ideal to base X for HQT solely on existing studies

Base productivity trend commonly reflects productivity research (e.g. ALTA, BC, ON, MA, ME, VT, NZ), not judgement based on other studies

Company and independently-funded studies are common in Phase 3 proceedings

Productivity trend of HQT also pertinent

Empirical research can aid growth factor design

**Base Productivity Trend (cont' d)**

Less evidence available on *transmission* productivity trend

Transmission MRI might have staggered term

Index might not begin until 2020

Doesn't have to be a separate Phase 2

>>> Plenty of time for a transmission productivity study

HQT is Regie's most important regulatory responsibility



**Is comprehensive revenue cap index too risky for HQT?**

PEG presented notional productivity trend results for HQT using simple "Kahn method"

**Calculating Kahn X Factors for HQT**

	Revenue Requis (%)	Inflation (%)	Operative Scale						Scale Index (%)	Implicit X Factor
			Retail Customers (%)	Weight	Tx Line Km (%)	Weight	Generation Capacity (%)	Weight		
	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	$\frac{[(C \times D) + (E \times F) + (G \times H)]}{A}$	$\frac{B}{(B + I) \times A}$
2003	0.76	2.35	1.10	0.36	0.33	0.54	0.02	0.19	0.46	2.05
2003	5.23	1.54	1.32	0.36	0.69	0.54	2.87	0.19	1.40	8.17
2004	2.51	1.84	1.10	0.36	0.16	0.54	0.85	0.19	0.63	-0.05
2005	2.51	2.12	1.17	0.36	0.18	0.54	2.26	0.19	1.02	0.63
2006	0.40	2.28	1.40	0.36	0.86	0.54	5.75	0.19	2.17	4.05
2007	2.45	2.43	1.40	0.36	0.55	0.54	1.21	0.19	1.03	1.01
2008	2.12	2.47	1.14	0.36	0.15	0.54	2.50	0.19	0.97	1.32
2009	3.29	1.16	1.19	0.36	0.18	0.54	1.37	0.19	0.99	1.13
2010	6.01	1.06	1.31	0.36	0.63	0.54	4.41	0.19	0.73	-4.23
2011	0.35	2.36	1.21	0.36	0.53	0.54	1.34	0.19	0.97	1.99
2012	-0.60	1.66	1.17	0.36	0.03	0.54	1.71	0.19	0.10	2.36
2013	1.94	1.73	1.11	0.36	-0.08	0.54	3.58	0.19	1.04	4.71
2014	6.75	2.23	0.91	0.36	0.89	0.54	2.53	0.19	1.30	3.22
2015	1.79	1.57	0.81	0.36	0.75	0.54	1.63	0.19	0.74	1.03
<i>Average annual growth rates:</i>										
2003-2015	1.48	1.91	1.23		0.37		1.70		0.97	1.41
2006-2015	2.01	1.89	1.19		0.44		1.78		1.00	0.99

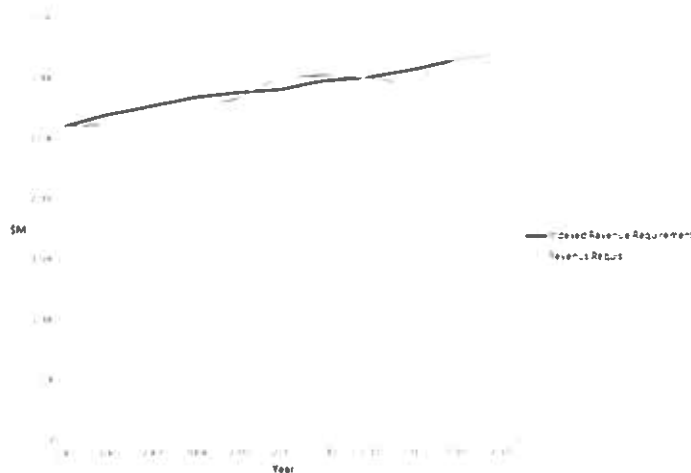


### How a Hypothetical Revenue Cap Index Tracks the Revenue Requis of HQT

	Simulated Revenue Cap					Revenue Requis		Differences	
	Inflation (%)	Implicit X Factor (%)	Scale Index (%)	Revenue Cap Index (%)	Indexed Revenue Requirement (\$M)	Level (\$M)	Growth Rate (%)	Level (\$M)	Growth Rate (%)
	{A}	{B}	{C}	{D = A * B * C}	{E}	{F}	{G}	{H = E * F}	{I = D * G}
2005					2,600	2,600			
2006	2.28	0.89	2.17	3.56	2,604	2,611	0.40	94	3.16
2007	2.43	0.89	1.03	2.57	2,765	2,675	2.45	89	0.12
2008	2.47	0.89	0.97	2.55	2,836	2,733	2.12	103	0.43
2009	1.16	0.89	0.99	1.27	2,872	2,824	3.29	48	2.02
2010	1.06	0.89	0.73	0.89	2,808	2,999	6.61	101	5.11
2011	2.36	0.89	0.97	2.44	2,970	3,009	0.35	40	2.10
2012	1.66	0.89	0.10	0.88	2,996	2,992	-0.60	4	1.47
2013	1.73	0.89	1.04	1.88	3,053	2,934	3.94	119	3.83
2014	2.23	0.89	1.30	2.64	3,134	3,139	6.75	4	-4.11
2015	1.57	0.89	0.74	1.43	3,180	3,180	1.79	0	0.14
<b>2006-2015 averages:</b>									
Growth rates:	1.89	0.89	1.00	2.01	NA	NA	2.01	NA	0.00
Levels:	NA	NA	NA	NA	2,940	2,900	NA	30	NA



### How a Hypothetical Revenue Cap Index Tracks the Revenue Requis of HQT



## Alternative “Hybrid” Revenue Cap

Basic Idea: Escalate revenue with mix of methodologies

“Old School” California approach (e.g. California, Hawaii)

O&M expenses Indexed

Capital Forecast assumes plant additions  
= HQT’ s recent historical average

Alberta

Revenue cap index nominally applies to all cost

Fixed “K-Bar” reflects recent HQT’ s recent average plant additions

Toronto Hydro-Electric:

Revenue cap index nominally applies to all cost

Fixed “C Factor” reflects any failure of index to recover forecasted total capital cost

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## Capital Cost Forecasting

**Pro** Accommodates capex surges  
Sidesteps index research  
Québec has forward test year tradition

**Con** Stairsteps don’t reflect real-time inflation  
Requires Regie blessing on capex budgets  
Multiyear cost forecasts difficult to review  
Utilities incentivized to exaggerate capex needs  
Utility eludes industry productivity growth standard  
Hard to ascertain performance improvement, customer value

>>> Increased need for regulators to commission independent engineering and benchmarking studies  
Regulators may require benchmarking or productivity-based budgeting

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## Capital Cost Trackers

Utilities operating under MRIs with index-based caps can experience capital revenue shortfalls if capex surges

Capital cost trackers can provide supplemental revenue

Tracker design a *major* source of controversy in Alberta

### Capital Cost Tracker: Pro

- Addresses capex surges not funded by index
- Some capex may be “idiosyncratic”
- Compensation for capex surges can reduce risk, make indexing possible

## Capital Cost Trackers (cont'd)

### Capex Tracker Con

- Capex surges may include capex incurred by utilities in productivity sample
- Plant additions produce capital revenue *surpluses* in later plans
- Utilities highlight capital revenue *shortfalls* while ignoring *surpluses*
- Companies incentivized to exaggerate capex needs

### >>> Material risk of overcompensation

- Utilities evade utility productivity growth standard
- Requires implicit preapproval of capex plans
- Difficult to ascertain need for capex surges
- True-ups to actual plant additions weaken performance incentives

## ***Capital Cost Trackers (cont'd)***

### **Remedies for Capital Tracker Problems**

- Limit scope of capex eligible for tracking
- High materiality threshold
- Incentivize trackers (e.g., hard caps & partial true ups of underspends)
- Raise X to ensure customers benefit of industry productivity trend
- Let utilities “borrow” escalation privileges from other plan years (or other plans)

### **Recommendations**

Limit opportunity for supplemental capital revenue

Details can be left to Phase 3

## ***Supplemental O&M Revenue***

No grounds for HQT's proposed P factor

- oCNE expenses are characteristically volatile
- oLast rate case (e.g. 2018) will presumably include sizable MGA budget
- oHQT has declined to forecast MGA expenses
- oSome MGA expenses will be capitalized
- oNo P factor precedents
- oPlan will have several risk mitigation provisions
- oLots of ways for HQT to manage CNE risk
- oHQT can be permitted to bunch revenue escalation privileges

## Appendix



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### Performance Metric Recommendations

	Performance Incentive Mechanisms	Other Metrics
<b>Transmission</b>		
<b>Reliability</b>	Frequency (normalized) Duration (normalized)	Frequency detail for point to point customers Duration detail for point to point customers Equipment failures
<b>Customer Service</b>	On time connections Miscellaneous	Customer Engagement Compliance with established standards Customer satisfaction (Independent point to point customers itemized)
<b>Safety</b>	Worker safety	
<b>Cost</b>		O&M, capital, and multifactor productivity indexes Unit cost metrics (O&M, total cost, losses)
<b>Other</b>	Selected environmental metrics	Other environmental metrics Transparency in regulation

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