Introduction

Québec's Régie de l'Energie chose key proviosions of a *mécanisme de réglementation incitative* ("MRI") for Hydro-Québec Distribution ("HQD") in D.2017-043

Several provisions remain to be resolved in Phase 3 of the proceeding

This hearing focusses on the revenue escalation mechanism

- Revenue Cap Index
  - Inflation measures
  - X Factor
  - S Factor
- Y factor
- Z factor

This presentation discusses views of PEG Research on these issues

Outstanding Issues

X Factor

Régie ruled that *Facteur X* in HQD's revenue cap index should be based on *jugement* after reviewing recent PMF studies and proceedings

My review of this evidence suggests that a **0.30%** X is appropriate

The following considerations are salient in choosing X

Conditions suggesting X should be around +0.3%

- Best available recent published study (Lowry 2017) indicated a **0.39%** U.S. power distributor PMF trend
- No special circumstances suggest a different trend is appropriate for HQD
- Alberta commission recently chose a **0.30%** X factor for power and gas distributors
- Ontario commission recently chose a **0.00%** X for power distributors
- Six Canadian utilities have recently proposed X factors of **0.00%** or higher

X Factor (*cont'd*)

Conditions suggesting X should be *higher*

- BC Commission chose a **0.93%** X factor for revenue cap index of FortisBC in 2014
- HQD has had productivity growth targets on most *charges d'exploitation* of **1.00%** or higher for several years and has typically achieved its target
- Kahn X factor appraisal of HQD's revenu requis suggested a **0.67%** X factor
  This was calculated on the basis of the 2005-2015 sample period
- Ratemaking treatment of input price inflation likely biased *in favor of* HQD
- Z factors are also likely to favor HQD, especially if major plant additions are eligible

Conditions suggesting X should be *lower*

Growth factor is 0.75 x growth Customers

Recent (though unvetted) estimate of **-0.9%** distributor PMF growth in Ontario

However, Ontario data are problematic in several respects

- Output index grows more slowly than customer growth by 34 basis points
- Recent change in accounting standards for most distributors slow O&M productivity

  [retirement cost Y factor of Toronto Hydro was occasioned by this]
- Poor quality of capital cost data

Irrelevant considerations

Other recent evidence ostensibly supporting a negative X is based on seriously flawed PMF methodologies

High-level consideration of key methodological issues can inform *jugement* process and help the Regie oversee upcoming productivity study

Coyne stated yesterday that *jugement* should "address shortcomings of TFP studies"

Credentials of Productivity Witnesses

Witness (Consultancy)	Energy Utility Productivity Trend Testimony	Utility-Sponsored Studies	Non-Utility Sponsored Studies
Lowry (PEG)	Over 30	At least 25	6
Makholm (NERA)	4	3	1
Meitzen (Christensen Associates)	2	2	0
Fenrick (PSE)	3	3	0
Carpenter (Brattle Group)	2	2	0
Coyne (Concentric Energy Advisors)	1	1	0

>>> All three witnesses who have recently advocated negative X factors have little energy utility productivity research experience and have worked exclusively for utilities on energy utility productivity issues

Productivity Basics

growth Productivity = growth Scale – Growth Inputs

Different kinds of productivity indexes for different uses

- Productivity in using capital, charges d'exploitation, and all inputs
- Productivity in providing distribution services or distribution + SALC services
- Productivity in cost containment or cost containment + marketing
- Focus on performance or calibration of a *revenue* (or price) cap index

PMF methods should be appropriate for this use

Main controversies in X factor calibration

- Measurement of scale
- Measurement of capital quantity

Methodological Issues

Brattle and Christensen studies which Concentric cites are based on flawed methodology of Dr. Jeff Makholm of NERA

Salient problems in an application to HQD

- Labor quantity treatment criticized by several witnesses and ultimately corrected
- Excludes SALC and general costs
- Volumetric scale (aka output) index is inappropriate in study for HQD
- Simple "one hoss shay " approach to measuring capital cost is sensitive to average service life assumption
- Makholm's service life assumption poorly substantiated, unreasonably low

Why service life matters

Under the one hoss shay treatment of capital cost, quantity of capital (XK_t) defined by

$$XK_t = XK_{t-1} + XK_t^{additions} - XK_t^{retirements}$$

Given a construction cost index (WKA_t), additions easily calculated since

$$XK_t^{additions} = Value\ of\ Additions/WKA_t$$

As for retirements

$$XK_t^{retirements} = Value\ of\ Retirements/WKA_{???}$$

XK_t growth is slower the higher is assumed average service life

>>> Average service life can be "fudge factor" producing a wide range of PMF results

Why service life matters (cont'd)

Makholm, Brattle, and Christensen assume ***33*** years, with no substantiation

HQD reports a **39** year service life

PEG showed in Alberta 2016 reply evidence that, with *37* year average service life, negative PMF trend with one hoss shay and Makholm's data *vanishes*

This evidence was never considered by Alberta commission and was not disputed

Review of distribution service lives suggests that average life is even higher

*Summary of Corrections and Modifications to NERA/Brattle/Christensen Productivity Calculations**

	MFP Trend (volume weighted averages, Brattle sample)	
	1973-2014	1997-2014
As Reported by Brattle	0.72%	0.72%
Corrections		
Salary Escalation Correction (Meitzen)	0.76%	0.59%
Correct Output Quantity Data	0.86%	0.43%
Use Gross Plant Benchmark with 20 year life	0.99%	0.28%
Use Gross Plant Benchmark with 33 year life	1.10%	0.17%
Exclude companies not included in PEG work	1.15%	0.12%
Methodological Upgrades (Major)		
Use One-Hoss Shay with a 37 year service life and a gross plant benchmark	1.62%	0.49%
Use Geometric Decay and a 33 year service life	1.31%	0.14%
Use Geometric Decay and a 37 year service life	1.23%	0.07%
Correct Data for Mergers and Mismatch	1.29%	0.15%
Methodological Upgrades (Other)		
Use total customers	N/A	0.18%
Variations on the PEG Work (all sample averages)		
PEG using only distribution, 37 year life, GDPPI, and a common sample	N/A	0.25%
PEG using only distribution, 37 year life and GDPPI	N/A	0.21%
PEG with 37 year life and GDPPI	N/A	0.37%
PEG with 37 year service life [Revised Testimony]	N/A	0.43%
PEG testimony [Original]	N/A	0.48%

* Annexe 1, C-AQCIE-CIFQ-0025, Table 2
MRI for Hydro-Québec Distribution

PEG

Pacific Economics Group Research, LLC

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Estimated Service Lives of Electric Distribution Assets of Select U.S. and Canadian Utilities

Studies (date)	Land and Land Rights	Structures and Improvements	Station Equipment	Poles, Towers and Fixtures	Overhead Conductors and Devices	Underground Conduit	Underground Conductors and Devices	Line Transformers	Services	Meters	Installations on Customers' Premises	Street Lighting and Signal Systems
Canada												
Hydro-Québec (2017)				47.0 (gross average)		35 (gross average)						
OEB (2010)		50	45	52.5	47.1	60	36	45	50.3	30		
EDTI (2010)		50	35	46	45	41	41	35		18		20
FortisBC (2014)	[illegible]		50	50	40			45	[illegible]	[illegible]	[illegible]	[illegible]
US												
Public Service of Colorado (2010)	60	60	65	50	50	60	45	45	40	22	26	38
San Diego Gas and Electric (2014)		63	53	47	56	57	45	36	36	40	34	18
San Diego Gas and Electric (2017)		54	40	44	40	53	40	33	40	40	19	32
Black Hills Power (2012)	40	40	45	50	50	37	40	36	62	21	30	25
Philadelphia Electric (2016)		50	50	53	52	65	53	49	52	15	38	24
Florida Power and Light (2016)		65	45	45	48	60	38	34	48	29	30	35
PECO (2015)		50	50	53	52	65	53	46	52	25	25	24
Consolidated Edison (2014)		57	60	60	80	80	50	34	66		60	80
Duke Energy Carolinas (2008)		45	38	43	40	45	45	35	38	20	35	29
PPL (2012)	65	65	50	55	45	65	53	39	42	15	27	30
Idaho Power (2008)		65	50	44	41	60	50	37	35	16	13	25
Oklahoma Gas and Electric (2008)	60	60	36	50	50	55	55	16	55	25	30	40
Southern California Edison (2015)		50	66	56	55	59	41	33	45	20		40
Western Massachusetts Electric (2016)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NSTAR (2016)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
[illegible] (2017)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Entergy Mississippi (2016)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Ameren Missouri (2013)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] and Electric Company (2015)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Duquesne Light (2013)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
Pacific Gas and Electric (2014)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Rochester Gas and Electric (2015)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
US Summary Statistics²												
Average	65	57	49	50	49	60	48	39	51	21	33	33
Max	90	70	66	65	80	80	65	50	70	40	60	60
Median	66	60	50	50	50	60	50	36	53	22	30	30
Min	40	40	35	30	35	30	30	25	35	15	13	17
Mean / Median	1.00	0.95	0.98	1.00	0.99	1.00	0.97	1.07	1.01	1.15	1.00	1.10
Mean without Max and Min	65.0	57.0	49.5	50.2	49.6	60.3	48.4	38.7	51.3	21.6	29.9	32.0
Adjusted / Normal Mean	100%	100%	101%	100%	100%	101%	100%	100%	100%	97%	98%	98%
Weight Calculation												
Aggregate Gross Value of Distribution Plant, Major US electric utilities, 1996¹ ³	2,340,000	1,888,3[illegible]	19,827,510	31,109,900	34,740,492	10,387,804	24,422,026	37,737,740	14,766,367	8,776,058	1,246,640	4,890,893
Share of Total Distribution Plant, 1996 (%)	0.94%	1.10%	12.19%	14.20%	15.15%	6.37%	14.90%	16.90%	9.00%	5.39%	0.76%	3.00%
Weighted Average Life of Distribution Plant	48.9											

Footnotes:
¹ Thousands of dollars
² Source: Financial Statistics of Major U.S. Investor Owned Utilities, [illegible]
³ Canadian service lives are excluded from these calculations [illegible]

PEG

Pacific Economics Group Research, LLC

Output Specification

Output specifications have evolved in energy utility PMF studies as *revenue* cap indexes become more popular

HQD's revenue cap index will have general form

$$growth\ Revenue = Inflation - X + growth\ Customers \qquad [1]$$

Since

$$growth\ Cost = Inflation + growth\ Inputs, \qquad [2]$$

X causes revenue cap index to track cost of *typical* distributor if

$$X = growth\ Customers - growth\ Inputs \qquad [3]$$

Alberta Utility Commission explicitly recognized this principle in first generic PBR proceeding

> The experts in this proceeding explained that by focusing on revenue per customer as opposed to prices per unit of gas delivered, the revenue-per-customer cap plan effectively shields the revenue of gas companies from variations in energy use per customer. In these circumstances, Dr. Schoechon behalf of AltaGas and Dr. Cicchetti on behalf of EPCOR acknowledged that the number of customers, not the volumes sold, becomes the driver of a company's revenues. The Commission agrees with Dr. Lowry and his colleagues at PEG that for revenue-per-customer cap plans, the number of customers, rather than a volumetric output [is] the correct output measure for a TFP study. Using similar logic, the Commission agrees with Dr. Lowry that output measures that place a heavy weight on volumetric and other usage measures should be used for TFP studies that are part of a price cap PBR plan.

But Alberta power distributors have *price* caps

Christensen used customers in recent PMF research when Eversource Energy proposed revenue cap and commission agreed

Eight other commissions (including the Regie and British Columbia) have approved PMF trends based on studies using customers as scale metric

>>> If customers IS correct output measure, bias of Makholm's *volumetric* scale index in an application to HQD depends on trend in AVERAGE USE

$$\begin{aligned} trend\ Volumes &= trend\ Customers + (trend\ Volumes - trend\ Customers) \\ &= trend\ Customers + trend\ Average\ Use \end{aligned} \qquad [4]$$

*Average Use Trends of U.S. Electric Utilities**

	Residential[1]		Commercial[1]		Average
	Level	Growth Rate	Level	Growth Rate	Growth Rate
Multiyear Averages					
1927-1930	478	7.06%	3,659	6.67%	6.86%
1931-1940	723	5.45%	4,048	2.00%	3.73%
1941-1950	1,304	6.48%	6,485	5.08%	5.78%
1951-1960	2,836	7.53%	12,062	6.29%	6.91%
1961-1972	5,603	5.79%	31,230	8.79%	7.29%
1973-1980	8,394	2.03%	50,576	2.53%	2.28%
1981-1986	8,820	0.12%	54,144	0.81%	0.46%
1987-1990	9,424	1.39%	60,211	2.29%	1.84%
1991-2000	10,061	1.15%	67,006	1.68%	1.41%
2001-2007	10,941	0.73%	74,224	0.64%	0.68%
2008-2014	11,059	-0.38%	75,311	-0.22%	-0.30%

[1] U.S. Department of Energy, Energy Information Administration, Form EIA-861, "Annual Electric Utility Report," Form EIA-826, "Monthly Electric Utility Sales and Revenues Report with State Distributions," and EIA 0035, "Monthly Energy Review."

* Rapport des experts amendé, C-AQCIE-CIFQ-0032, Table 1

Output Specification (cont'd)

Conclusions:

- Declining average use is chiefly responsible for *slowdown* in power distributor PMF growth since 1990 using Makholm's methods
- Even Mr. Coyne notes that PMF slowdown is mainly due to *output*
- This slowdown has little bearing on the choice of an X factor for HQD
- After 2000, growth in average use using Makholm method dissipates, revealing underlying problem of 33 year average service life
- Sample period becomes a hotly contested issue
- Pertinent measure of PMF growth for HQD is not "trending negative"
- Undue weight need not be placed on latest studies and decisions (e.g., Eversource)

Recapping

Alberta commission's acceptance of Makholm's PMF methods invited (inexperienced) utility witnesses to cherry pick a favorable *truncated* sample period (e.g., 2000-2016)

Makholm himself has routinely used a much longer sample period in which PMF growth is positive (e.g., 1972-2016); he has never advocated sole reliance on a truncated sample period and recently proposed a 0.0% X factor in Ontario.

Brattle and Christensen (and Concentric) have *not* questioned Makholm's weakly supported capital cost treatment, which favors utilities, *even though these companies (like Concentric) have not used one hoss shay in past PMF studies*

Massachusetts commission recently fell for this gambit and acknowledged a **-0.46%** national distribution PMF trend

But in 2013 this commission *rejected* an MRI proposal by another power distributor (Unitil) based on a **+1.19%** PMF trend

>>> Process of jugement should not ignore key methodological issues

Methodological Issues (*cont'd*)

Advantages of PEG's Methodology

Most studies (including Berkeley Lab) include SALC and general costs

Customer growth is the scale variable

>>> PMF trend more stable, does not slow markedly after 2000

PEG's PMF trend estimates have fallen over the years, but mainly due to an enlarged sample

Reasonable average service life assumption (37 years)

But geometric decay method for measuring capital cost is less sensitive to average service life assumption

Larger sample than Makholm/Brattle/Christensen use

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Statistique Canada Utility-Sector PMF Index

Concentric report also features utility sector PMF index calculated by Statistics Canada

- Component of private business sector productivity study
- Includes all electric utilities, gas distributors, water and utility industries
- "Value-added" index excludes intermediate inputs
- Output sensitive to declining average use of power, gas, and water
- Costs include conservation and load management

>>> Not a pertinent study

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Critique of Concentric Evidence

Biased and uninformative presentation of the available evidence

Uninformative

Glosses over critically important methodological issues that

- affect appropriate weighting of recent studies and decisions
- must be considered by Regie in Phase 3 when reviewing HQD's PMF research plan

Coyne takes no position on these issues when questioned

Biased

Focuses on studies by witnesses in recent proceedings, not commission decisions or scholarly studies, when most recent witness studies

- were prepared for utilities
- used inappropriate and/or controversial PMF methods

Selectively presents favorable results from these studies

Concentric Dos and Don'ts

Inconsistently applied criteria for screening evidence

- *Don't* want to consider Dr. Lowry's study for U.S. government
  Do want to consider Statistics Canada study of utility sector
- *Don't* want to consider Dr. Lowry's unvetted Alberta Reply evidence
  Do want to consider Mr. Fenrick's unvetted Ontario evidence
- *Don't* want to relitigate Dr. Lowry's Alberta Reply Evidence
  Do want to relitigate Christensen and Brattle evidence
- *Do* highlight recent studies that favor HQD
  Don't mention the *most* recent studies, by Lowry and Makholm, which favor consumers
- *Do* believe that every *disadvantage* HQD might face should be considered in X factor design as an "implicit stretch factor"
  Don't believe that any *advantages* HQD faces should influence X design

Productivity "X" Factor: Recent Trends

The negative trend in productivity is confirmed across multiple experts and sources

Year	StatCan MFP Utility Sector Multifactor Productivity	2012 AUC Proceeding NERA Results	2016 AUC Proceeding Brattle Update of NERA	2016 AUC Proceeding PEG Study for CCA	2016 AUC Proceeding Christensen Study	Christensen Eversource Industry TFP	PSE - Hydro One Ontario Industry TFP	Makholm EGD TFP Growth
2000	2.4%	2.1%	2.1%	1.0%	2.0%			1.9%
2001	7.9%	3.4%	3.4%	1.0%	3.2%			2.9%
2002	7.8%	1.2%	1.2%	1.7%	1.8%	-0.1%		2.2%
2003	3.0%	2.4%	2.4%	1.4%	2.1%	2.1%	0.8%	2.8%
2004	3.0%	2.8%	2.8%	1.4%	3.0%	1.9%	1.3%	3.3%
2005	2.8%	2.1%	2.1%	1.2%	2.2%	0.1%	2.2%	2.4%
2006	3.1%	2.5%	2.5%	0.0%	-2.2%	1.0%	0.2%	3.0%
2007	4.2%	0.5%	0.5%	0.0%	0.5%	-0.4%	1.5%	0.8%
2008	0.5%	-4.9%	-4.9%	0.2%	-4.4%	-2.3%	-0.6%	-4.9%
2009	6.7%	2.6%	2.6%	0.8%	3.7%	2.0%	-0.1%	2.9%
2010	1.5%		2.2%	0.4%	1.7%	-2.2%	0.8%	2.1%
2011	1.0%		-4.5%	0.5%	3.9%	-1.9%	1.3%	-4.4%
2012	2.4%		-2.0%	1.2%	-2.0%	0.6%	-3.9%	-2.1%
2013	3.1%		-0.2%	0.0%	-0.6%	-0.2%	-4.5%	-0.4%
2014	1.9%		1.8%	-0.1%	1.7%	1.0%	-2.0%	1.9%
2015	2.1%					0.2%	-2.8%	-1.4%
Post-2000 Average	-1.1%	-0.7%	-0.9%	0.5%	-0.8%	-0.5%	-0.9%	-0.9%
Last 5 Years Average	-2.1%	-1.5%	-1.3%	0.4%	-1.3%	-0.5%	-2.9%	-2.0%

Adjustment for Capital Trackers

Concentric argues that X factor should be lower because HQD does not include a capital cost tracker (or C factor).

PEG notes...

- Relation of X to supplemental capital revenue has been raised in several Canadian proceedings
- Capital trackers provide extra $$ for costs that sampled utilities routinely incur, raising risk of double counting
- Regulators have nonetheless usually *rejected* proposals to *raise* X because companies have capital cost trackers or C factors
- Massachusetts commission *did* acknowledge this connection and raised X factor for Eversource substantially because it will have a capital cost tracker
- HQD has not forecasted high capex during this MRI
- But Regie has allowed for possibility of supplemental capital cost funding through the Z factor and HQD supports this

>>> X factor should, if anything be higher if there is a major plant Z factor

Z factor and inflation treatments also favor HQD

No "implicit stretch factor" in HQD plan

Input Price Differential

MRIs in United States frequently use macroeconomic inflation measures like the GDPPI

Macro inflation contains substantial productivity trend of the US economy, and may differ from the industry input price trend

X factor is therefore sometimes decomposed into a productivity differential and an input price differential

This is not a concern for HQD

- Inflation measure will include a labor price index
- Changes in allowed ROE will be accorded Y factor treatment
- Productivity trend of Canadian economy is close to zero

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Stretch Factor

Propose modest 0.20% stretch factor for HQD

Recent success in containing charges d'exploitation

Cost containment incentives generated by this plan won't be strong

- 4 year term
- MTER
- Possible Z factoring of major plant additions

0.20% is the norm for average cost performers

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Inflation Measures

Inflation measure recommendation depends on what is Y factored

Combustible not Y factored

Average weekly earnings + IPC Quebec

Combustible Y factored

Average weekly earnings

+ Gross domestic product implicit price index for final domestic demand

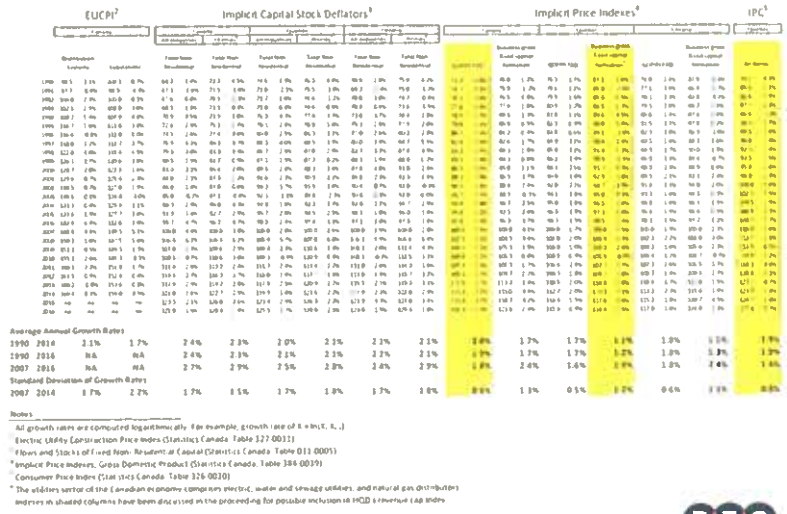
Insufficient evidence to choose HQD's proposed 3 part index

Asset price index is biggest concern

Under traditional regulation, implicit price index for capital is complex function of past construction cost trends

Unclear what asset price index would capture this trend

How Alternative Canadian Asset Price Indexes Compare to Contemplated Macro Indexes[1]



MRI for Hydro-Québec Distribution

Y Factors

Eligible Costs

Yes:	Power supplies
	Transmission
	Conservation and demand management (all)
	Weather normalization
	WACC
Maybe:	Retirement
No:	Major capital projects

Materiality Threshold:

$15 million for each cost category, including deadzone, except power supply, transmission, conservation and demand management

For other categories,

Supplemental revenue = max [(Cost - $ 15 mm), 0]

There are numerous precedents for such cost tracker deadzones

MRI for Hydro-Québec Distribution

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Z Factors

Eligible Costs

Yes
- *Pannes majeurs*
- Unforeseeable events in *reseaux autonomes*
- *Tarif de maintien de la charge*
- Contributions to connections
- Changes in accounting standards
- Miscellaneous external events

No
- Major capital projects

Materiality Threshold: $15 million, including deadzone

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Summary of Recommendations

Summary of PEG's Recommendations

Revenue Cap Index	
Inflation Measure	Combustible included: Average weekly earnings and $IPC^{Québec}$
	Combustible Y Factored: Average weekly earnings and $GDPIPIFDD^{Canada}$
X Factor	0.30%
Stretch Factor	0.20%
Y Factor	
Eligible Costs	Yes: Power supplies, transmission, conservation and demand management (all) Maybe: Retirement costs
Materiality Threshold	$15 million per annual variance
Z Factor	
Eligible Costs	*Pannes majeurs*, unforeseeable events in *reseaux autonomes*, *Tarif de maintien de la charge*, contributions to connections, changes in accounting standards, miscellaneous external events
Materiality Threshold	$15 million per annual event

Appendix

References

Lowry, Mark Newton and David Hovde, *PEG Reply Evidence*, Alberta Utilities Commission Proceeding 20414, Exhibit 20414-X0468, June 22, 2016.

Lowry, Mark Newton, Matt Makos, and Jeff Deason, *State Performance-Based Regulation Using Multiyear Rate Plans for U.S. Electric Utilities*, Lawrence Berkeley National Laboratory, July 2017.

Makholm, Jeff D. and Agustin Ros, *Total Factor Productivity Study for Use in AUC Proceeding 566 – Rate Regulation Initiative*, Exhibit 0080.02, NERA Economic Consulting, December 30, 2010.

Makholm, Jeff D. and Agustin Ros, *Update, Reply and PBR Plan Review for AUC Proceeding 566 – Rate Regulation Initiative*, Exhibit 0391.02, NERA Economic Consulting, February 22, 2012.