REPONSES DE AQCIE-CIFQ/PEG A DEMANDE DE RENSEIGNEMENTS N°1 D'HQT/CONCENTRIC ENERGY ADVISORS

DEMANDE DU TRANSPORTEUR DE MODIFICATION DES TARIFS ET CONDITIONS DES SERVICES DE TRANSPORT POUR L'ANNÉE 2019

R-4058-2018

Questions de Concentric Energy Advisors

1. Préambule :

i) C-AQCIE-CIFQ-018
Mémoire p. 16

"Concentric correctly notes that the X factors chosen by the AER for power transmitters have varied appreciably between the transmitters and over time. The X factors are frequently negative. However, this evidence has limited relevance to the choice of an X factor for CNE revenue. One reason is that these X factors are very sensitive to expected trends in capital cost. Consider also that, as we explained in Section 3.1, the general formula for a revenue cap index is growth revenue = inflation – growth productivity + growth scale.

The terms of this formula can be rearranged as follows
growth revenue = inflation - (growth productivity – growth scale).

Since the AER revenue cap indexes do not have scale escalators, the X factors must be set low enough to fund the cost impact of scale growth."

1.1. Please provide a reference from the AER demonstrating that "X factors must be set low enough to fund the cost impact of scale growth."

1.2. Please confirm that scale growth is included in the utility cost forecasts that are included in the AER's allowed X factors.

PEG Responses:

1.1. PEG is not aware of any such commentary by the AER. However, it is plain that in a revenue cap index set in the Australian manner without a scale variable, the I – X formula must fund growth in operating scale. The Régie should keep this in mind when considering Australian X factor precedents.

1.2. PEG confirms that growth in operating scale is considered in the revenue requirements that provide the basis for the AER's X factors. X is then set to cover the revenue requirement growth.

2. Préambule :

i) C-AQCIE-CIFQ-018
Mémoire p. 19

" PSE also calculates transmission productivity trends of a sample of 48 U.S. electric utilities over the twelve-year 2005-2016 sample period. Key findings of PSE's productivity research are as follows.

• Over the full sample period, the multifactor productivity trend of the sampled utilities averaged a 1.71% decline. Capital productivity averaged a 1.93% annual decline while CNE productivity averaged a more modest 0.83% annual decline. Hydro One's PMF averaged a much smaller -0.31% decline during this period. Hydro One's CNE productivity averaged 1.07% annual growth while its capital productivity averaged a 0.58% annual decline.

• Over the more recent 2010-2016 period, the PMF growth of sampled US transmitters averaged a 2.40% annual decline. Capital productivity averaged a 3.17% annual decline while CNE productivity growth was flat. The PMF growth of Hydro One averaged a more modest -0.47% decline. The capital productivity of Hydro One averaged a 1.17% decline while CNE productivity averaged 2.90% growth. These results run counter to Concentric's narrative that the CNE productivity of transmitters has declined in recent years.

• PSE recommended and HOSSN (sic) proposed an X factor of 0."

2.1. Please provide the working papers or other source material and appropriate references utilized for the cited breakdown between capital and CNE related productivity.

2.2. Please verify that the start year was 2004 and not 2005 for the PSE study.

PEG Response:

2.1. PEG is not at liberty to provide the PSE working papers, which are only available upon the signing of a confidentiality agreement to participants in an Ontario proceeding. PEG computed the partial factor productivity trends from the data in the PSE report. Here is a summary of their calculations.

Sample Period	Output Quantities	O&M Quantities	Capital Quantities	O&M Productivity	Capital Productivity
2005-2016	0.72%	1.55%	2.65%	**-0.83%**	**-1.93%**
2010-2016	0.48%	0.48%	3.65%	**-0.00%**	**-3.17%**

2.2. Not confirmed. The first reported growth rate in the PSE study is for 2005.

3. Préambule :

i) C-AQCIE-CIFQ-018
Mémoire p. 19

"*The transmission productivity study was supervised by Steven Fenrick. While Mr. Fenrick was an employee of PEG for several years and shares our views on some methodological issues, he has not to our knowledge previously prepared a power transmission productivity study.* "

3.1. Please provide any transmission productivity study conducted by Dr. Lowry, Mr. Makos or Mr. Legge.

3.2. Did Mr. Fenrick assist with any of these or other transmission studies while at PEG?

PEG Response:

3.1. PEG has not yet completed its productivity study in the HOSSM proceeding. Its only previous transmission productivity study was prepared by Dr. Lowry many years ago for Hydro One Networks and is confidential.

3.2. PEG records reveal that Mr. Fenrick did play some role in its transmission productivity study for Hydro One. He was a recent hire with an undergraduate degree and was not one of the three named authors.

4. Préambule :

i) C-AQCIE-CIFQ-018
Mémoire p. 20

"*The 2005-2016 sample period for the research is rather short for a CNE productivity trend study. Data are now available through 2017. The 2005 start date is ostensibly due to the fact that this is the first year data are available for a transmission peak demand variable which we are not sure is essential to the study. PSE's productivity results are fairly sensitive to the choice in sample period.* "

4.1. On what basis does PEG conclude that peak demand is not essential to the study?

PEG Response:

4.1 There is another peak demand variable available on FERC Form 1 which has an earlier start date. Note also that PSE's econometric research found the length of transmission lines to be a much more important driver of total transmission cost than peak demand. Furthermore, it is not clear how important peak demand is as a driver of *CNE*. The peak load capacity of transmission substations is another pertinent variable.

5. Préambule :

i) C-AQCIE-CIFQ-018
Mémoire p. 20

"*Growth in each scale index is a weighted average of growth in ratcheted peak demand and the length of transmission lines. The weights (26% for demand and 74% for lines) were obtained from econometric cost elasticity estimates from a total cost function, not a CNE function.*''

5.1. Is there any possible weightings that would move the CNE productivity trend for 2004-2016 to zero or above zero?

5.2. Absent econometric cost elasticity estimates from a CNE function, what does PEG believe would be the most appropriate weights to use in this case? What would the CNE productivity results be for the 2004-2016 time period using those weights?

PEG Response:

5.1. Not for these two variables, which grew slowly during the sample period. However, the growth in other scale variables that may drive CNE has been more rapid. An example is transmission substation peak load capacity.

5.2. PEG would speculate that ratcheted peak demand, line length, and the number and peak load capacity of transmission substations are pertinent scale-related drivers of transmission CNE. Their weights are an empirical issue. The trends in the number and peak load capacity of transmission substations are unknown.

6. Préambule :

i) C-AQCIE-CIFQ-018
Mémoire p. 20

"*Our experience suggests that the costs excluded from transmission O&M expenses must be thought through carefully due to major changes in the structure of the U.S. transmission industry which occurred during the sample period.*"

6.1. Please describe the "major changes in the structure of the U.S. transmission industry which occurred during the sample period"

6.2. What costs would PEG suggest excluding from transmission O&M expenses? How does this differ from the definition used by PSE in their study?

PEG Response:

6.1. The principal change that is referenced in this passage is the establishment in many regions of independent transmission system operators, some of which are designated by the FERC as regional transmission organizations. These organizations undertake some transmission functions previously performed by the utilities. Moreover, utilities are charged large sums for transmission services by these organizations even though they own a sizable share of the transmission systems that provide the services. There is a risk that transmission costs of some utilities will be double counted.

6.2. The costs that PEG has in its own research excluded from its transmission studies on the basis of these concerns include those in FERC accounts 561-561.8, 565, 573. The 561 accounts contain load dispatching expenses which are sometimes handled by regional transmission organizations. Account 565 is the expense associated with purchased transmission services from others that include "wheeling". Account 573 is miscellaneous transmission expenses. We have found that this account can be volatile and sometimes contains large one-time charges. Of these accounts PSE only excludes account 565.

7. Préambule :

i) C-AQCIE-CIFQ-018
Mémoire p. 20

"*Due to Ontario data limitations, the CNE weights for labor and material and service expenses were unnecessarily fixed for all sampled utilities at 38% and 62% respectively. US data permit these weights to vary by year. Chain-weighted quantity indexes are generally more accurate measures of input quantity trends.*"

7.1. Has PEG tested the hypothesis that chain-weighted quantity indices are more accurate? If so, please provide supporting evidence.

7.2. Does PEG believe making this change would produce a materially different result? If so, please provide an estimate of the change in the result.

PEG Response:

7.1. The accuracy advantages of chain-weighted quantity indexes are well established in the literature on economic indexes and do not require testing by PEG.

7.2. PEG has not yet performed this exercise but believes that use of a chain-weighted CNE input price index would have a modest but material effect on CNE productivity growth.

8. Préambule :

i) C-AQCIE-CIFQ-018
Mémoire p. 21

- *PSE uses a 1989 benchmark year adjustment to calculate capital cost for US utilities in the sample even though a 1964 benchmark year is feasible for these utilities. This may significantly reduce the accuracy of the capital and multifactor productivity results.*

- *Capital cost is calculated using a methodology that, like geometric decay, features a constant depreciation rate. However, the PSE methodology excludes capital gains, so that the PMF indexes tend to overemphasize the importance of the (more negative) capital productivity trend.*

- *PSE does not exclude companies from its sample which had sizable transfers of assets between the transmission and distribution sectors of the utility. This is a potential problem when monetary methods are used to calculate capital costs.*"

8.1. Please describe how these issues which affect the measurement of capital have any impact on the measurement of O&M (CNE) productivity.

PEG Response:

8.1 These issues likely would not affect estimates of *O&M* (CNE) productivity but may materially affect estimates of *multifactor* productivity. PEG mentioned these concerns because multifactor productivity trends of power transmitters should also interest the Régie as it considers the best way to conduct a multifactor productivity study. PEG's critique of the PSE study was not limited to those issues that have implications for the CNE revenue cap index.

9. Préambule :

i) C-AQCIE-CIFQ-018
Mémoire p. 21

"*Concentric is correct to note on p. 32 of its April report that U.S. power transmission utilities are typically regulated by the Federal Energy Regulatory Commission ("FERC") using formula rate plans.*"

9.1. Please indicate where on p. 32 of its report that Concentric indicates that U.S. transmission utilities are "typically regulated" under formula-based rates.

PEG Response:

9.1 Concentric does not use the world "typically" in its four page commentary on formula rate plans but does convey the impression that they are common in U.S. power transmission. Concentric is based in a state (Massachusetts) where this regulatory system is used and power transmission costs have risen rapidly in recent years.

10. Préambule :

i) C-AQCIE-CIFQ-018
Mémoire p. 21

ii) B- HQT- 0067

i) "*These plans effectively involve comprehensive cost trackers that weaken cost containment incentives. Concentric states in response to DDR 5.1 from PEG that in general, a multi-year rate plan contains stronger incentives than an annual adjustment plan (such as the FEC's formula rate).* "

ii) "

Demande:

5.1 Please that formula rates produce weaker incentives to contain O&M expenses than the MRI which the Regie has chosen for HQT.

Réponse :

Partially confirmed.

In general, a multi-year rate plan contains stronger incentives than an annual adjustment plan (such as the FEC's formula rate), but the FERC formula rate has no earning's sharing mechanism to reduce its incentive properties and there is opportunity in any given year for companies to exceed or miss their allowed ROE.

"

10.1. Please confirm that Concentric indicated, in its full response to this question, that a MTER weakens the incentive properties:

PEG Response:

10.1. PEG acknowledges this but notes that the MTER that HQT uses asymmetrically shares only surplus earnings. Moreover, under the Company's proposal HQT's share of these earnings would be jeopardized in periods of poor IMQ scores.

11. Préambule :

i) C-AQCIE-CIFQ-018
Mémoire p. 21

"*PEG presented results in an incentive power model in the Appendix of its first MRI report. We reported that the long-run annual efficiency gains achieved under an MRI with a three-year rate case cycle and no MTÉR was 90 basis points higher than under cost plus regulation. This should be taken into account when appraising trends in the productivity of U.S. transmission utilities. HQT's MRI does have a MTÉR but this shares only surplus earnings and has a four-year term.*"

11.1. Please confirm that the "incentive power model" presented in PEG's appendix was based exclusively on a hypothetical utility and assumptions by PEG, without any actual data on utility performance. If not confirmed, please reference the actual utility data employed in this analysis.

PEG Response:

11.1 PEG notes that its incentive power model was designed and parameterized using sensible assumptions that are pertinent for a wires utility like HQT. These assumptions were outlined on pages 136-137 of PEG's report in Phase 1 of the PBR proceeding. The Phase 1 report was filed as Exhibit C-AQCIE-CIFQ-0107 in R-3897-2017. A more detailed description of the technical details of the incentive power model can be found in Attachment HQT-AQCIE-11.1.

12. Préambule :

i) C-AQCIE-CIFQ-018
Mémoire p. 7 and p. 27

"*Productivity has tended to grow.*"

"*The available data from Australia, Canada, and the United States do not on balance indicate a recent general decline in transmission CNE productivity.*"

12.1. Other than studies prepared by PEG, is PEG aware of any North American utility productivity study conducted in the past 5 years that has not shown a negative productivity trend since 2000 in the electric utility or electric transmission industry? If so, please cite those studies.

12.2. Please provide the basis for the assertion referenced at page 7.

PEG Response:

12.1. PEG notes that it has prepared numerous productivity studies over the last five years which address various costs and utility industries. Its clients for these studies included utilities, a regulatory agency, consumer groups, and Lawrence Berkeley National Laboratory. Most of the other North American productivity studies made public in the last five years were prepared by witnesses who had limited experience at energy utility productivity measurement and who work largely or entirely for utilities. Most of the studies by these witnesses use a methodology developed by Jeff Makholm of NERA which PEG has found to be seriously flawed. These witnesses cherry pick a sample period since 2000 for which productivity growth was typically negative even though Dr. Makholm has never advocated a negative X factor based on his research.

In the Eversource PBR proceeding, Dr. David Dismukes made corrections to the Christensen Associates version of the Makholm methodology which resulted in positive productivity trends for both the US and Northeastern power distribution industries.[1] Dr. Dismukes also filed a productivity study in the Until PBR proceeding that showed positive productivity trends.[2]

12.2. Most studies of utility productivity which Dr. Lowry has prepared or reviewed over the years have shown a positive trend. Results vary with the nature of the

[1] Massachusetts DPU 17-05, Exhibit AG/DED-Surrebuttal-1, Sch. DED-Surrebuttal-1, p. 1, lines 14 and 15.
[2] Massachusetts DPU 13-90, Exhibit AG/DED-1, Schedule DED-12.

productivity research and the sample period. For example, productivity growth has been slower when a revenue-weighted output index is used, a specification which is appropriate in the design of a price cap index but not a revenue cap index. In the electric utility industry, the productivity growth of OM&A inputs has often been found to be higher than the productivity growth of capital inputs.

The most recent productivity studies from Australia for both power distributors and transmitters have shown opex partial factor productivity trends that are becoming more positive. The uptick in opex partial factor productivity for transmitters has brought the long-term trend to nearly zero. Table 2.1 of the most recent report by the Australian Energy Regulator's consultant highlights the recent uptick in the opex partial factor productivity trend of power transmitters.[3]

Table 2.1 **Industry–level transmission output, input and total factor productivity and partial productivity indexes, 2006–2017**

Year	*Output*	*Input*	*TFP*	*PFP Index*	
	Index	*Index*	*Index*	*Opex*	*Capital*
2006	1.000	1.000	1.000	1.000	1.000
2007	1.007	1.023	0.984	1.005	0.976
2008	1.022	1.038	0.985	1.025	0.968
2009	0.971	1.107	0.877	0.951	0.848
2010	1.054	1.152	0.915	0.985	0.887
2011	1.060	1.161	0.913	1.041	0.868
2012	1.056	1.204	0.877	1.008	0.832
2013	1.059	1.205	0.879	1.051	0.823
2014	1.064	1.247	0.853	0.976	0.812
2015	1.064	1.273	0.836	0.966	0.793
2016	1.051	1.291	0.814	0.939	0.773
2017	1.103	1.278	0.863	0.993	0.820
Growth Rate 2006–17	0.89%	2.23%	–1.34%	–0.06%	–1.81%
Growth Rate 2006–12	0.91%	3.09%	–2.19%	0.13%	–3.07%
Growth Rate 2012–17	0.87%	1.20%	–0.32%	–0.28%	–0.29%

The Australian Energy Regulator has become sufficiently confident in a positive opex partial factor productivity trend for power distributors that it recently proposed a 1% productivity trend to be embedded in distributor cost forecasts.[4] Table 2 of this draft decision highlights the rapid opex productivity growth of Australian power distributors in recent years.

[3] Denis Lawrence, Tim Coelli, and John Kain (2018), *Economic Benchmarking Results for the Australian Energy Regulator's 2018 TNSP Annual Benchmarking Report*, p. 3.
[4] Australian Energy Regulator (2018), *Draft decision paper Forecasting productivity growth for electricity distributors*, p. 26.

Table 2 Average annual opex MPFP growth by business, per cent

Distributor	Current period	Base year efficient?	Average annual opex MPFP growth		
			2006–16	2006–12	2012–16
Evoenergy	2014–19	No	2.3	–4.7	12.7
Ausgrid	2014–19	No	–1.2	–3.5	2.2
CitiPower	2016–20	Yes	–2.8	–7.1	3.6
Endeavour Energy	2014–19	Yes	–2.1	–2.5	–1.4
Energex	2015–20	No	–0.6	–3.1	3.3
Ergon	2015–20	Yes	1.6	1.5	1.6
Essential Energy	2014–19	No	0.3	–7.3	11.5
Jemena	2016–20	Yes	–0.7	–1.3	0.1
Powercor	2016–20	Yes	1.4	–1.2	5.4
SA Power Networks	2015–20	Yes	–2.2	–4.5	1.2
AusNet Services	2016–20	Yes	–4.7	–4.4	–5.3
TasNetworks	2017–19	Yes	0.1	–4.9	7.7
United Energy Distribution	2016–20	Yes	–1.3	–3.1	1.4
Industry average			**–0.9**	**–3.5**	**3.0**

Note: Distributors marked with an asterisk are those we found to be materially inefficient in our most recent regulatory determination.
Source: Economic Insights, *Economic benchmarking results for the Australian Energy Regulator's 2017 DNSP benchmarking report*, 31 October 2017; AER analysis.

13. Préambule :

i) C-AQCIE-CIFQ-018
Mémoire p. 28

"*On the basis of available evidence, it is reasonable to assume that HQT's proposed CNE revenue requirement for 2019 reflects average cost performance.*"

13.1. Please provide quantitative analysis and the arguments for this assumption.

PEG Response:

13.1 The evidence on which this assumption is based is discussed at some length on p. 28 of PEG's November report. HQT has never submitted a total cost benchmarking study like that which Hydro One Transmission recently undertook in support of an MRI proposal. On the other hand, the Company's recent cost growth has been slow. Frequent rate cases have generally weakened the Company's cost containment incentives but a *formule parametrique* has been established to address CNE growth. On balance, there is no reason to believe that the Company is a *poor* cost performer but not enough evidence to conclude that it is a *good* performer.

14. Préambule :

i) C-AQCIE-CIFQ-018
Mémoire p. 29

ii) R-3897-2014, C-AQCIE-CIFQ-0107
Mémoire p. 106

i) "*Considering all of these factors, we believe that a stretch factor of 0.20% is reasonable for HQT if its X factor is based on Australian, Canadian, or and European productivity evidence. A considerably higher stretch factor would be warranted were the base productivity growth factor to be driven solely by U.S. power transmission productivity research.*"

ii) "*PEG stated in its Phase 1 Report in this proceeding, on p. 106: The Phase 2 study should, if HQT's data permits, consider the division's productivity trends as well as the trends for a large sample of investor-owned US power transmission utilities.*" (emphasis added)

14.1. Why is a higher stretch factor justified if the X factor is based on U.S. evidence?

14.2. Does this imply that PEG believes U.S. transmission utilities are less efficient than their Australian, Canadian or European counterparts? Please provide any statistical basis or industry studies that would support this assumption.

14.3. Please reconcile this recommendation with the above comment on the need to change the stretch factor for the use of U.S. utilities.

PEG Response:

14.1. PEG discusses the rationale for a stretch factor on p. 27 of its November report. They state that one basis for the stretch factor value in an MRI is the difference between the incentive power of the MRI and the incentive power of the typical regulatory systems under which utilities in productivity studies used to set the X factor operated. The incentive power of the formula rate plans typically used by U.S. power transmitters is unusually low whereas the CNE expenses of HQT will be addressed by a revenue cap index during the MRI. This should be recognized in setting the stretch factor to the extent that the base productivity trend is established using US transmission productivity results.

14.2 Operation under formula rate plans should tend to slow the productivity *growth* of U.S. transmission utilities relative to that of their counterparts in Australia, Great Britain, or western Europe which typically operate under MRIs. However, the *level* of cost efficiency in the US could nonetheless be higher and this is an unresolved empirical issue.

14.3 The effect of the regulatory system on productivity *growth* is what matters, so the responses to 14.1 and 14.2 are consistent. Whatever their productivity growth, the experience of U.S. transmission utilities is still pertinent to setting X factors for HQT because there are numerous transmitters and the quality of the data needed for multifactor productivity studies in the US are unusually good.