Outstanding Issues in the Design of an MRI for Hydro-Québec Transmission

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Table of Contents

1. Introduction

The Régie de l'energie ("Régie") has been engaged for several years in the development of *mécanismes de réglementation incitative* ("MRIs") for transmission and distribution services of Hydro-Québec. Decisions concerning many provisions of an MRI for Hydro-Québec Transmission ("HQT" or "the Company") were made in D-2018-001 (January 2018). However, final decisions concerning the X factor and several other plan provisions will be made in the Company's *dossier tarifaire* for 2019.

In April 2018, HQT submitted a report by its consultant, Concentric Energy Advisors ("Concentric"), on the X factor issue. In July 2018 the Company filed a *demande tarifaire* with additional evidence and recommendations on outstanding MRI issues. This evidence included another report by Concentric which addressed MRI issues.

Pacific Economics Group Research LLC ("PEG") personnel have for many years been the leading North American consultants on MRIs for gas and electric utilities. Work for diverse clients that include consumer and environmental groups, regulators, government agencies, utilities, and trade associations has given our practice a reputation for objectivity and dedication to good regulation. In Canada we have played a prominent role in MRI proceedings in Alberta, British Columbia, Ontario, and Québec. The Association Québécoise des Consommateurs Industriels d'Électricité and the Conseil de l'Industrie Forestière du Québec have retained us and the Régie has authorized funding for us to comment on outstanding MRI issues in this proceeding and to provide our own recommendations.

Section 2 of our report reviews pertinent details of HQT's current regulatory system and of the Régie's recent MRI decisions. Outstanding MRI issues in this proceeding are then treated in succession. On each issue, a summary of HQT's position is followed by PEG's response.

2. Background

HQT has for several years filed annual rate cases. For several years the Régie has used a *formule paramétrique* as a tool to appraise HQT's proposed *charges nettes d'exploitation* ("CNE", or operation and maintenance expenses) in *dossiers tarifaires*. This formula has an inflation measure, an X factor, and a growth factor.

A *mécanisme de traitment des écarts de rendement* ("MTÉR" or earnings-sharing mechanism) was established for the Company that shares only positive earnings variances (i.e., surplus earnings). The first 100 basis points of surplus earnings is shared evenly between customers and the Company. 75% of all surplus earnings in excess of 100 basis points are assigned to customers, while the Company keeps 25%.

Article 48.1 of the *Loi sur la Régie de l'énergie* ("the *Loi*") requires MRIs for power transmission and distribution services of Hydro-Québec.[1] These mechanisms must fulfill the following objectives:

1. *l'amélioration continue de la performance et de la qualité du service;*
2. *une réduction des coûts profitable à la fois aux consommateurs et, selon le cas, au Distributeur ou au Transporteur;* and
3. *l'allégement du processus par lequel sont fixés ou modifiés les tarifs du Transporteur d'électricité et les tarifs du Distributeur d'électricité applicables à un consommateur ou à une catégorie de consommateurs.*

In D-2018-001 the Régie issued its final decision in Phase 1 of its proceeding to develop an MRI for HQT. This decision determined the broad outlines of the mechanism. A multiyear rate plan with a four-year term will feature a revenue cap. The revenue requirement for the first year of the plan (2019) will be established in the current *dossier tarifaire*. During the last three years of the plan the revenue

[1] Québec National Assembly, 40th legislature, 1st session, Bill n°25 (2013, Chapter 16): An Act respecting mainly the implementation of certain provisions of the Budget Speech of 20 November 2012, Chapter 1, Division 1 as passed June 24, 2013.

requirement for CNE will be escalated by a *formule d'indexation.*[2] The full list of costs that will be addressed by this formula is unresolved.

The *formule d'indexation* will include an inflation measure ("I"), an X factor, and a growth factor ("C"). The Régie has tentatively chosen the same approach to the general design of the inflation measure which it chose for the revenue cap index of Hydro-Québec Distribution ("HQD"). Growth in the inflation measure would be a weighted average of growth in the *indice des prix à la consommation* ("IPC^{Québec}") and the average hourly earnings in Québec as calculated by the *Enquête sur l'emploi, la rémunération et les heures de travail* ("EERH^{Québec}").

The growth factor will be the same as that which HQT has used in its *formule paramétrique* for CNE since D-2009-015. This factor is driven by plant additions in the categories "*maintien et amelioration de la qualité du service*" and "*croissance des besoins de la* clientèle". The revenue requirement adjustment is based on the assumption that the present value of CNE growth from plant additions over a 20 year period is 19% of the total costs of the investment.3

A provisional X factor, applicable for at least two years of the MRI, will be determined by a process of informed "*jugement*" and not based, instead or additionally, on a custom power transmission productivity study that uses historical industry operating data. However, HQT was ordered to undertake a study of the productivity of power transmitters during the MRI term, and to present "*la méthodologie et l'échéancier*" for this study in its Phase III evidence.[4]

The Régie decided not to address the revenue requirement for "*éléments de coûts reliés aux investissments*" using the *formule d'indexation*.[5] A cost of service approach will instead be used to escalate the Company's sizable revenue requirement for depreciation and return on rate base. However, the Régie asked HQT to propose a non-binding *formule paramétrique* for these costs as a

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[2] The Régie specified that expenses subject to indexing will include *frais corporatifs*, *achats de service de transport*, *les autres revenus de facturation interne, la facturation externe, and interest reliés au remboursement gouvernmental*.

[3] The assumption is outlined in Attachment J of Hydro-Québec's Open Access Transmission Tariff and has changed over time.

[4] D-2018-001, p. 32, par. 112.

[5] D-2018-001, p. 53, par. 201.

point of comparison to the Company's actual and proposed capital costs during the plan. This formula shall include a growth factor that is applicable to these costs.[6] The Régie expressed interest in the eventual inclusion of capital in the *formule d'indexation* for a transmission MRI.

Supplemental revenue adjustments will be permitted via Y and Z factors. The Régie tentatively proposed that retirement costs be addressed by the indexing formula and not Y factored. It did not rule on the eligibility of several other costs for Y or Z factor treatment. The Régie proposed materiality thresholds of $2.5 million for the Y and Z factors. The suggestion of a $2.5 million threshold was based on a threshold the Régie previously established for HQT's *budgets spécifiques* in D-2012-059.

The materiality thresholds would apply to the creation and continuation of Y factors and to the creation of Z factors. The Régie did not propose to use materiality thresholds as deadbands that make HQT absorb some of the costs.

The plan will have an MTÉR similar to that approved in D-2014-034 and linked to the Company's service quality. HQT's service quality shall be monitored using metrics like those already reported in the Company's *dossiers tarifaires.* These metrics "*devront s'inspirer de ceux utilisés actuellement dans le cadre des dossiers tarifaires*" and should notably address the following four transmission service quality dimensions:[7]

- reliability of service
- availability of the network
- customer satisfaction
- public and employee safety.

The Régie also approved in D-2018-0001 a « *clause de sortie permettant la révision ou interruption du MRI »*.[8] Details of this *clause* and the performance metrics and linkage to the MTÉR are as yet unresolved. No *clause de succession* or *mécanisme de report des gains d'efficience* (« MRE », or efficiency carryover mechanism) were approved.

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[6] D-2018-001, p. 73, par. 299.

[7] D-2018-001, p. 40, par. 158.

[8] D-2018-001, p. 33, par. 121.

3. Revenue Cap Index

3.1 Principles and Methods for Revenue Cap Index Design

In this section of the report we discuss pertinent principles and methods for the design of revenue cap indexes. We begin by discussing basic indexing concepts. There follow discussions of the use of indexing research in revenue cap index design and other methodological issues. Special considerations in the design of a revenue cap index for CNE are highlighted.

Basic Indexing Concepts

The logic of economic indexes provides the rationale for using price and productivity research to design revenue cap escalators. To review this logic, it may be helpful to make sure that the reader has a high-level understanding of some basic tools of index research.

Input Price and Quantity Indexes

The growth (rate) of a company's cost can be shown to be the sum of the growth of an input price index ("Input Prices") and an input quantity index ("Inputs").

growth Cost = growth Input Prices + growth Inputs.[9] [1]

Both of these indexes are typically multidimensional in the sense that they summarize trends in subindexes that are appropriate for particular subsets of cost.

Productivity Indexes

The Basic Idea A productivity index is the ratio of a scale index ("Scale") to an input quantity index.

$$Productivity = \frac{Scale}{Inputs}. \quad [3]$$

It can be used to measure the efficiency with which firms use inputs to achieve their scale of operation.

Some productivity indexes are designed to measure productivity trends. The growth of such a productivity index is the difference between the growth in the scale and input quantity indexes.

growth Productivity = growth Scale – growth Inputs. [4]

[9] Cost-weighted input price and quantity indexes are attributable to the French economist Francois Divisia.

Productivity grows when the scale index rises more rapidly (or falls less rapidly) than the input index. The productivity growth of utilities can be volatile but has historically tended to grow over time. The volatility is typically due to demand-driven fluctuations in operating scale and/or the uneven timing of certain expenditures. The volatility of productivity growth tends to be much greater for individual companies than the average for a group of companies.

Relations [1] and [4] imply that

growth Productivity = growth Scale – (*growth Cost - growth Input Prices*)

= growth Input Prices - growth (*Cost/Scale)*

Productivity growth is thus the amount by which a firm's unit cost grows more slowly than its input prices.

Some indexes are designed to measure only productivity trends. "Bilateral" productivity indexes are designed to compare only productivity levels. For example, the productivity level of HQT in 2016 can be compared to the average for U.S. power transmitters in the same year. Multilateral" productivity indexes are designed to measure *both* trends and levels. These indexes are sometimes used in benchmarking studies.

The scope of a productivity index depends on the array of inputs which are considered in the input quantity index. Some indexes measure productivity in the use of a single input group such as labor. A *multifactor* productivity index [p*roductivité multifactorielle* (“PMF”)] measures productivity in the use of multiple inputs. PMF indexes are sometimes called total factor productivity indexes, a term that is usually a misnomer since in practice some inputs are excluded from the index calculations.

Scale Indexes A scale index of a firm or industry summarizes trends in the scale of operation. These indexes may also be multidimensional. Growth in each dimension of scale that is itemized is then measured by a subindex and the scale index summarizes growth in the subindexes by taking a weighted average of them.

In designing a scale index, choices concerning scale variables (and weights, if the index is multidimensional) should depend on the manner in which the index is used. One possible objective is to measure the impact of growth in scale on *revenue*. In that event, the scale variables should measure growth in *billing determinants* like peak demand and the weight for each itemized determinant should be its share of a utility's base rate revenue.[10]

Another possible objective of scale indexing is to measure growth in dimensions of scale that affect *cost*. In that event, the scale variable(s) should measure dimensions of the "workload" that drive cost.[11] If there is more than one scale variable in the index the weight for each variable should reflect its relative cost impact. The sensitivity of cost to a small change in the value of a business condition variable is commonly measured by its cost "elasticity." Cost elasticities of utilities can be estimated econometrically using data on the costs and operating scale of a group of utilities. A productivity index calculated using a cost-based scale index will be denoted as $Productivity^C$.

$$\textit{growth Productivity}^C = \textit{growth Scale}^C - \textit{growth Inputs}. \qquad [5]$$

This may fairly be described as a "cost efficiency index."

Use of Index Research in MRI Design

Productivity studies have many uses, and the best methodology for one use may not be best for another. One use of productivity research is to measure the trend in a utility's operating efficiency. Another is to calibrate the X factor in a rate-cap or revenue-cap index. In this section, we discuss the logic for using productivity research in revenue cap index design and consider some implications for the appropriate design.

Revenue Cap Indexes

We begin our explanation of the supportive index logic by considering the growth in the revenue of a firm that earns, in the long run, a competitive rate of return.[12] For such a firm, the long-run trend in revenue equals the long-run trend in cost.

$$\textit{trend Revenue} = \textit{trend Cost}. \qquad [6]$$

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[10] Revenue-weighted scale indexes are attributable to the French economist Francois Divisia.

[11] A multidimensional scale index with elasticity weights is unnecessary if econometric research reveals that there is one dominant cost driver.

[12] The assumption of a competitive rate of return applies to unregulated, competitively structured markets. It is also applicable to utility industries and even to individual utilities.

Consider now the following basic result of cost theory:

$$growth\ Cost = growth\ Input\ Prices - growth\ Productivity^{C} + growth\ Scale^{C}. \qquad [7a]$$

The growth in the cost of a firm is the difference between the growth in input price and cost efficiency indexes plus the trend in a consistent cost-based scale index. This result provides the basis for revenue cap escalators of general form

$$growth\ Revenue = growth\ Input\ Prices - X + growth\ Scale^{C} \qquad [7b]$$

where

$$X = \overline{Productivity^{C}} + S. \qquad [7c]$$

Here Productivity^{C} is the trend in the productivity of a sample of utilities and S is the stretch factor. Notice that a cost-based scale index should be used in the supportive productivity research for a revenue cap index X factor. Moreover, this index should match the scale index in the revenue cap index.

Sample Period

Another important issue in the design of a rate or revenue cap index is whether it should be designed to track short-run or long-run industry cost trends. Indexes designed to track short-run growth will also track the long run growth trend if this approach is used repeatedly over many years. An alternative approach is to design the index to track only long-run trends.

Different approaches can, in principle, be taken for the input price and productivity components of the revenue cap index and are in most cases warranted. The inflation measure should track short-term input price growth. Meanwhile, productivity research for X factor calibration commonly focuses on discerning the current long-run productivity trend. This is the trend in productivity that is unaffected by short-term fluctuations in operating scale and inputs. The long run productivity trend is faster than the short-run trend during a short-lived surge in input growth or lull in output growth but slower than the trend during a short-lived lull in input growth or surge in output growth.

This general approach to revenue cap index design has important advantages. The inflation measure exploits the greater availability of inflation data. Making the revenue cap index responsive to short term input price growth reduces the operating risk of the utility without weakening its performance incentives. Having X reflect the long-run industry productivity trend, meanwhile, sidesteps the need for more timely cost data and annual productivity calculations.

To calculate the long-run productivity trend using indexes it is common to use a lengthy sample period. However, a period of more than twenty years may be unreflective of current business conditions. Quality data are often unavailable for sample periods of even this length. The need for a long sample period is lessened to the extent that volatile costs are excluded from the study and the scale index does not assign a heavy weight to volatile scale variables.

Application to CNE Revenue

Suppose, now, that statistical cost research is being used to design a revenue cap index for CNE revenue. In that case, the pertinent cost growth formula analogous to relation [7a] is

$$\textit{growth CNE} = \textit{growth Input Prices}_{CNE} - \textit{growth Productivity}^{C}_{CNE} + \textit{growth Scale}^{C}_{CNE}. \quad [8a]$$

The growth of CNE is the sum of the growth in CNE input prices and a CNE scale index less the growth in CNE productivity. The productivity index should use a cost-based scale index that is consistent with the revenue cap index scale escalator.

This result provides the basis for the following CNE revenue cap index

$$\textit{growth Revenue}_{CNE} = \textit{growth Input Prices}_{CNE} - X + \textit{growth Scale}^{C}_{CNE} \quad [8b]$$

where

$$X = \overline{\textit{Productivity}^{C}}_{CNE} + S. \quad [8c]$$

Here $\text{Productivity}^{C}_{CNE}$ is the trend in the CNE productivity of a sample of utilities and S is the stretch factor. Notice that a cost-based scale index should be used in the supportive productivity research for a revenue cap index X factor. This index should match the scale index in the revenue cap index.

Econometric research on drivers of CNE is useful for establishing elasticity weights for the scale index. Cost theory is useful for choosing CNE model variables. It reveals that the minimum cost of CNE is a function of CNE input prices, output variables, and quantities of capital inputs. A scale index for CNE productivity research may thus include measures of the size of the capital stock such as its capacity to provide service. In the case of power transmission CNE, for example, pertinent scale variables include transmission line miles and the MVA of transmission substation capacity. In addition to being potentially important CNE drivers, capacity variables like these are less volatile than some transmission output variables such as peak demand.

Research by PEG in many utility industries has revealed that CNE productivity growth tends to be volatile. This is chiefly due to volatility in expenditures. To the extent that this is true, longer sample periods are needed to capture CNE productivity trends.

Sources of Productivity Growth

Research by economists has found the sources of productivity growth to be diverse. One important source is technological change. New technologies permit an industry to attain given levels of scale with fewer inputs.

Economies of scale (*economies d'échelle*) are another important source of productivity growth. These economies are available in the longer run if cost has a tendency to grow less rapidly than scale. A company's potential to achieve incremental scale economies is greater the greater is the growth in its scale.

A third important driver of productivity growth is change in X inefficiency. X inefficiency is the degree to which a company fails to operate at the maximum efficiency that technology allows. Productivity growth will increase (decrease) to the extent that X inefficiency diminishes (increases). The potential of a company to reduce X inefficiency is generally greater the lower is its current efficiency level.

Another driver of productivity growth is changes in the miscellaneous business conditions, other than input price inflation and demand, which affect cost. A good example for an electric power transmitter is the share of transmission lines which are underground. An increase in the share of lines which are underground will tend to slow multifactor productivity growth but accelerate growth in the productivity of O&M inputs.

Choosing a Base Productivity Growth Target

Research on the productivity of other utilities can be used in several ways to calculate base productivity growth targets. Using the average historical productivity trend of the entire industry to calibrate X is tantamount to simulating the outcome of competitive markets. The competitive market paradigm has broad appeal.

On the other hand, individual firms in competitive markets routinely experience windfall gains and losses. Our discussion above of the sources of productivity growth implies that differences in the external business conditions that drive productivity growth can cause different utilities to have different productivity trends. For example, power transmitters experiencing brisk growth in the operating scale are more likely to realize scale economies than transmitters experiencing average customer growth.

In the design of rate and revenue cap indexes, there has thus been considerable interest in methods for customizing base productivity growth targets to reflect local business conditions. The most common approach to customization to date has been to use the average productivity trends of similarly situated utilities.

3.2 HQT's Evidence and Proposal

Inflation Measure

HQT presented 11 years of inflation measure calculations, including labor and non-labor weight calculations, using an approach it believes is consistent with that which the Régie approved for HQD in D-2018-067.

X Factor

The Company embraced the **-0.60%** X factor recommendation made by Concentric. This includes a **0%** stretch factor.

PMF Study

HQT presented a schedule for the PMF study but did not present any details of the methodology that the study will use. The Company does not intend to present a methodology until it receives the Régie's X factor decision in this case and retains a consultant to do the study.

3.3 PEG's Response

Inflation Measure

PEG has no objections to the proposed labor price index or weights assigned to the two inflation measures. The gross domestic product implicit price index for final domestic demand ("GDPIPIFDD") is an alternative to the IPC which merits consideration.[13] The GDPIPIFDD is less sensitive than the IPC to irrelevant fluctuations in energy and farm commodity prices. It is routinely used by the Ontario Energy Board in the construction of MRI inflation measures. It is available for Canada and Québec.

A downside of using the GDPIPIFDD is that annual GDPIPIFDD data do not become available for the previous year until the end of the following year (e.g., Annual 2017 data just became available). The November release also incorporates data revisions for the 2 years immediately preceding the data year (e.g., in 2018 that would be 2016 and 2015). After the third year, these data are not normally revised again except when historical revisions are carried out.

Base Productivity Growth Target

The *Jugement* Process

In an earlier stage of the proceeding, Concentric successfully advocated a process of *jugement* for setting the X factor for HQT. However, it notes on p. 38 of its April report that "The broad array of productivity studies (and specifically total factor productivity studies) utilized in distribution programs to set revenue path trajectories are lacking for transmission companies." Its two MRI reports focused on transmission productivity and cost trend information from Europe, Australia, and New Zealand and on a "Kahn method" exercise for calculating X based on HQT data.

The process of informed *jugement* which Concentric recommended for X factor selection works less well for power transmission than for distributor services due to the lack of pertinent transmission productivity studies and X factor rulings. This quandary, readily foreseeable, is all the more unfortunate since a study of the CNE productivity of transmitters --- the issue in this proceeding --- is relatively simple to undertake because the complicated and sometimes controversial tasks of measuring capital costs and the trends in capital prices and quantities are sidestepped.

[13] Statistics Canada. Table 36-10-0223-01, Implicit price indexes, gross domestic product, provincial and territorial.

Concentric instead relies heavily for its recommendation on statistical cost research and decisions by regulators outside North America. In our view, this review is of limited value in establishing an X factor for the Company's CNE revenue cap index and does not support Concentric's -0.60% X factor recommendation. We discuss research here from each of the regions that Concentric discusses in turn.

European Research

- Concentric notes in its July report that the E3Grid [power transmission] benchmarking study considers total expenditures and not CNE. Since power transmission is a highly capital-intensive business, the E3Grid productivity estimates are very sensitive to capital cost trends. Concentric acknowledges on page 10 of the report that the E3Grid study is not pertinent for setting the Company's X factor for CNE revenue.
- Concentric notes on p. 29 of its April report that the Norwegian regulator has a 1.5% annual "general efficiency requirement".

The "RIIO" form of MRI which is currently used by Great Britain's Office of Gas and Electric Utility Markets ("Ofgem") to regulate power transmitters features multiyear rate plans with 8-year terms. The revenue caps are based in part on projections of required costs which embed productivity growth assumptions. Concentric states that

> Ofgem incorporates a proposed productivity improvement of 0.8% per year applied to total expenditures (Totex). For [National Grid Electricity Transmission], this number is composed of a 0.5% Opex productivity target and 0.8% Capex productivity target, suggesting that Capex is dominating Opex in the Totex. These targets are based on a combination of benchmarking analysis and forecast review by Ofgem.[14]

However, the numbers Concentric reported were actually for Ofgem's appraisal of "Real Price Effects", which is Ofgem's measure of the difference between the trends in industry input prices and the retail price index. Ofgem explained the difference between real price effect and ongoing efficiency assumptions in its cost assessment and uncertainty supporting document to its final proposals for National Grid's transmission service.

> The [real price effects] assumption, and associated ex ante allowance, reflects the expectation that there will be a difference between the change in the [macroeconomic inflation measure]

[14] Concentric, July report, p. 11.

> and the change in the price of inputs that the [transmission utilities] will purchase over the price control, most notably labour. The ongoing efficiency assumption reflects the expectation that even the most efficient network company can make productivity improvements, for example by employing new technologies. This assumption represents the potential reduction in input volumes that can be achieved whilst delivering the same outputs.[15]

Ofgem approved an ongoing efficiency assumption of **1.0%** for opex and **0.7%** for capex. These assumptions are based primarily on work that Ofgem undertook using the EU KLEMS dataset. This dataset is published by the Conference Board and provides total and partial factor productivity measures for various sectors of the economy (e.g., construction, agriculture, manufacturing). Ofgem developed its total and partial factor productivity assumptions using KLEMS data for the 1970-2007 period for most industries in the UK.

Ofgem also reviewed several other sources of productivity evidence. For example, it relied on transmitters' own assumptions of ongoing efficiency growth. Another source was a decision by British regulators to set similar ongoing efficiency targets for the British water industry.[16] No study of power transmission productivity was relied upon to support Ofgem's productivity targets.

Concentric downplayed the significance of Ofgem's decision to set a positive opex productivity target by highlighting exclusions to the revenue cap, noting that

> there are several adjustments to allowed revenues, providing increased revenue allowances for innovation spending, for volume-based cost drivers including load and non-load related Capex, a provision for "uncertainty mechanisms" and related adjustments.[17]

However, many of these adjustments would not address allowed CNE revenues. For example, the referenced "volume-based cost drivers" are proposed to address specific kinds of capital investments. Ofgem did approve trackers for costs of legacy pensions (e.g., pension plans that have been closed to participants) and provided an opportunity for National Grid to request additional funding for the enhancement of physical security and the roll-out of innovative programs if certain criteria were met.

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[15] Ofgem (2012), RIIO-T1: Final Proposals for National Grid Electricity Transmission and National Grid Gas Cost assessment and uncertainty Supporting Document, p. 22.

[16] Ofgem (2012), RIIO-T1/GD1: Real Price Effects and Ongoing Efficiency Appendix, Final Decision-Appendix, p. 19.

[17] Concentric, July report p. 11.

A recent annual report by Ofgem on the performance of transmitters under the first generation RIIO MRI found that, despite revenue requirements that reflected expectations of positive opex and capex productivity growth, British power transmitters are still expected to overearn during the plan term by more than 200 basis points. The source of more than half of these overearnings has been power transmitters managing to spend less than their allowances

Australian Research

The Australian Energy Regulator ("AER") has jurisdiction over several power transmission utilities. These are regulated using multiyear rate plans that feature revenue caps with inflation – X formulas designed to recover revenue requirements approved on the basis of cost forecasts and statistical cost research. Here are some comments on Concentric's Australian evidence.

- 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.

- The AER's studies of power transmission multifactor productivity are also very sensitive to capital cost trends. Moreover, these studies use a controversial "physical asset" approach to capital quantity measurement. For example, substation capacity and the lengths of overhead and underground transmission lines are treated as capital quantities. This approach to capital quantity measurement ignores the tendency of depreciation to slow cost growth.

The physical asset approach to capital quantity measurement has been twice rejected by the Ontario Energy Board ("OEB") in MRI proceedings as a tool for measuring PMF growth.[18] We conclude that the AER PMF index results are not useful in the establishment of X factors for the Company's CNE revenue or its total revenue.

- Concentric notes on p. 15 of its July report that the opex productivity of Australian power distributors averaged -0.64% over the 2006-2016 sample period. Excluding "redundancy payments" for labor downsizings the number falls to -0.39%. Concentric notes on p. 39 of its April report that "the average contribution of OPEX to total factor productivity was estimated at -0.3% over the 2006-2016 period."

  These are pertinent results for the Régie to consider. However, the latest iteration of the AER's opex PFP study featured an output index based on 5 variables: energy throughput (23.1%), ratcheted maximum demand (19.4%), end-user numbers (19.9%), and circuit length (37.6%) less minutes off-supply. These weights have been determined using econometric parameter estimates from a cost function.[19] The same scale index was used in the multifactor productivity indexes.

- Concentric's reports do not discuss the assumption of CNE productivity growth that the AER uses when escalating CNE revenue requirements. The most recent assumed opex productivity growth assumption for power transmitters is **0.00%.** This was used in a draft decision on the CNE revenue requirement for TasNetworks in September 2018. The AER stated in its decision that

  > We have forecast zero productivity growth based on analysis provided previously by our expert consultant, Economic Insights. We consider this reflects a reasonable expectation of the benchmark productivity that an

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[18] OEB proceedings EB-2007-0673, Supplemental Report of the Board on 3rd Generation Incentive Regulation for Ontario's Electricity Distributors, September 17, 2008, p. 12. and EB-2016-0152, Decision and Order, December 28, 2017, pp. 126-127.

[19] Prior to 2017, the weights for the power transmission scale index used by the AER's consultant were energy throughput (21.4%), ratcheted maximum demand (22.1%), voltage-weighted entry and exit connections (27.8%) and circuit length (28.7%) less energy not supplied (weight based on Australian Energy Market Operator's current value of customer reliability). These earlier weights were determined using econometric parameter estimates from a cost function of translog form.

efficient and prudent transmission network can achieve for the forecast period because:

- Economic Insights has previously recommended we forecast productivity growth based on trend growth in opex MPFP performance measured in electricity transmission
- opex MPFP growth, over the period from 2006 to 2016 is negative, but very close to zero, at the industry level. We do not consider this is representative of long term trends and our expectations of forecast productivity in the medium term. The increase in the service provider's inputs, which is a significant factor contributing to negative productivity, is unlikely to continue for the forecast period. [20]

Hydro One Research

In response to a *demande de renseignement* ("DDR") from *Option consommateurs* ("OC"), Concentric referenced a power transmission productivity study submitted in October in an Ontario Energy Board proceeding by Hydro One Sault Ste. Marie ("HOSSM"). HOSSM owns a power transmission system in central Ontario which was formerly part of Great Lakes Power. Following Hydro One's acquisition of and merger with Great Lakes Power Transmission in 2016, HOSSM is now part of the transmission operations of Hydro One Transmission but is still separately rate-regulated. HOSSM is proposing a multiyear rate plan it calls Revenue Cap Incentive Rate-setting for its transmission services. The proposed plan would feature an eight-year term and a revenue cap index with an inflation – 0 formula. Also in October, Hydro One Transmission proposed to use this same revenue cap index to effect a "one-year mechanistic adjustment to Hydro One's 2019 revenue requirement.[21] Hydro One plans to file an MRI for its transmission services next year.

The proposed X factor is supported by productivity research and testimony prepared by Power Systems Engineering ("PSE"), which is based in Madison, Wisconsin. The PSE report does not consider the productivity trend of HOSSM but does present an estimate of the PMF trend of Hydro One Transmission.

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[20] AER Draft Decision, *TasNetworks Transmission Determination 2019-2024*, Attachment 6, Operating expenditure, September 2018, p. 6-18.

[21] OEB Proceeding EB-2018-0130, Exhibit A, Tab 3, Schedule 1, October 26, 2018.

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 proposed an X factor of 0.

The Ontario Energy Board retained PEG on October 31st to appraise PSE's research and testimony in this proceeding and provide alternative evidence. The working papers for this work were received the day our testimony in this proceeding was due. DDRs will not be submitted for several weeks. Hydro One will then have several additional weeks to provide answers to questions from PEG, Board staff, and intervenors. Hence, the PSE productivity study will not be properly vetted for some time.

PEG has nonetheless conducted a preliminary review of PSE's evidence in the HOSSM proceeding. Based on this review, we have several concerns about this research. Here are some of the most important ones.

- 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.

- The number of companies in the productivity sample is rather small, as many other large investor-owned electric utilities in the United States provide transmission services. Reasons for excluding other companies are unknown and should be carefully examined.
- No attempt is made to choose a peer group facing business conditions that are similar to those facing Hydro One.
- 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 of the sample period.[22]
- 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.
- 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.
- 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.
- 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.

[22] A similar problem was encountered in the recent Ontario Power Generation MRI proceeding.

- 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.

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. Regulatory Research Associates noted in a recent report that

> FERC policy has been to permit utilities to establish transmission rates using a formula-based approach that updates rates annually through the filing of revised data in a utility's tariff. The annual updates are based primarily on each utility's costs as reported in its annual FERC Form 1 filing. Approximately 100 utilities nationwide currently employ formula rates.[23]

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).[24]

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.

<u>HQT Kahn Method Research</u>

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[23] Regulatory Research Associates (2018), *RRA Regulatory Focus An Overview of Transmission Ratemaking in ISO New England – 2018 Update*, October 25, p. 2.

[24] R 4058-2018, B-0067, Réponses du Transporteur, 23 October, p. 9.

PEG introduced the Kahn method for calculating X factors in our initial testimony in this proceeding. In its recent July evidence, Concentric used the Kahn method to calculate an X factor using the Company's CNE data and the Régie's prescribed treatments for the inflation measure and scale variable. Concentric notes in its July report that this research produced a **0.57%** X factor for the full 2009-2017 sample period for which data were gathered. A **-0.64%** trend was noted for the more recent 2013-2017 period. The result for this period is deemed by Concentric to be more pertinent for X factor selection. These results include *prestations de travail*. In response to Question 11 of FCEI, the Company reported that when these costs are excluded from the calculations the indicated Kahn X factor was **0.88%** for the full sample period and **-0.94%** for the more recent 2013-2017 sample period. In response to FCEI DDR 11.4, Concentric stated that "Concentric did not review a forecast of HQT costs that would be subject to the X factor."

We believe that the longer sample period that Concentric considered is more pertinent for the following reasons.

- We noted in Section 3.1 that CNE productivity is characteristically volatile, and this speaks to the need for a longer sample period to smooth out fluctuations.
- HQT discussed the recent rapid rise in its CNE in response to DDRs 10.2 and 10.4 of the Régie. They noted that CNE growth was stimulated during the 2013-2017 period by the Company's transition to a new asset management system that raised maintenance expenses. Cost was further raised by the implementation of new critical infrastructure protection ("CIP") standards. HQT refused to answer legitimate questions by SE-AQLPA which were intended to assess whether the recent acceleration in CNE expenses needs to continue.
- An MTÉR was instituted in 2017 which weakened the Company's cost containment incentives. The Company also has an incentive to have high CNE in the base year of the MRI, all the more so since X will likely not be adjusted for the results of a statistical benchmarking study.
- The PMF growth of Canada's economy has accelerated in the last few years. This may have caused IPC^{Canada} to understate the inflation in prices of utility CNE inputs.

We do not agree with Concentric when they say in response to DDR 10.4 of the Régie that "operating expenditures are subject to shorter term operating and economic trends. It is therefore appropriate to consider shorter periods of measurement." To the contrary, the greater volatility of CNE speaks to the need for longer sample periods.

Canadian Utility Sector Productivity

Concentric correctly notes on p. 36 of its April report that the longstanding gap between the PMF trends of the U.S. and Canadian private business sectors has recently narrowed. Canadian PMF has accelerated while U.S. PMF has slowed.

Concentric notes on p. 36 of its April report a "declining productivity growth in the (Canadian) utility sector, as illustrated in the multifactor productivity data provided by Statistics Canada." These trends are also noted in response to information request 10.4 of the Régie. PEG has criticized this research and its pertinence for utility X factors in several past proceedings. In our last MRI evidence for HQD, for example, we explained that *Statistique Canada* has calculated PMF indexes for the "utility" sector of the Canadian economy and two subsectors: "Electric power generation, transmission, and distribution" and "natural gas distribution, water, and other systems".[25] Though *Statistique Canada* continues to maintain the utility sector index, the two subsector indexes were terminated in 2010.

These indexes have been calculated in the past on both a "gross output" and a "value added" basis. The gross output approach is more similar to that conventionally used in productivity studies for X factor calibration because it includes intermediate inputs like materials and services. The value-added approach does not include these inputs because it is intended for use in the calculation of the PMF growth of Canada's aggregate business sector.[26] Only results for the value-added utility PMF index are reported on a timely basis, and it is these results that CEA reports in its April submission.

Results of the value-added utility PMF index that CEA features in its report are of limited relevance in setting an X factor for HQT, for several reasons.

[25] Régie proceeding R 4011-2017, C-AQCIE-QFIC-0024, MRI Design for Hydro-Québec Distribution, January 5, 2018.

[26] It is difficult to use macroeconomic data to compute the PMF of the aggregate private business sector if intermediate inputs are included.

- A value-added calculation places an unusually heavy weight on capital productivity but ignores productivity in the use of intermediate inputs that are components of CNE.
- The index is sensitive to developments in the generation sector of the electric utility industry. This has little relevance to network industries such as power transmission. For example, the growth in the index has in recent years presumably been slowed by Hydro-Québec projects to develop remote hydroelectric resources.
- The electric utility industry restructured in Alberta and Ontario. It is not clear how well this has been handled by *Statistique Canada*.
- A volumetric scale index is employed that makes results sensitive to changing business conditions, such as slowing growth in average use of natural gas and electricity by residential and commercial customers, which matter little in the design of the Company's *formule paramétrique* for CNE revenue. Dr. Lowry explained in his Phase 1 testimony that the scale specification in a productivity study used to calibrate the X factor of a revenue cap index should ideally be consistent with the scale metric that is used in that index.
- Measured power industry productivity growth is also slowed by growth in expenses for utility conservation and load management programs. These are large in several Canadian provinces but are irrelevant to the design of a CNE revenue cap for the Company.

The *Statistique Canada* PMF indexes for "electric power generation, transmission, and distribution" and "natural gas distribution, water, and other systems" are available on a gross value basis through 2010. On average, the productivity of the gas and water sector grew by 0.55% annually between 1962-2010. For the most recent 20 years (1991-2010) productivity declined by 0.09% per year on average, and for the most recent ten (2001-2010) it declined by 1.44%. Output was once again measured volumetrically, and thereby reflected the material downward trend in the average use of gas by Canadian residential and commercial customers.

As for the PMF index for the "electric power generation, transmission, and distribution," using the gross output approach, Statistics Canada reports a 0.61% average annual growth rate in utility sector productivity for the full 1962-2010 period. For the most recent 20 years (1991-2010), the average growth rate is 0.41%. For the most recent ten years (2001-2010), productivity declines by a modest

0.12% annually. This comparison suggests that the gas and water sector contributed greatly to the negative productivity growth that *Statistique Canada* reported for the full Canadian utility sector.

The Alberta Utilities Commission ("AUC") stated in its decision on first-generation MRI for provincial energy distributors that

> Overall, the Commission considers that while Statistics Canada's MFP indexes . . . can be a useful reference for gauging the general productivity trends of the utilities sector, these analyses cannot be a substitute for a TFP study for either the electric or gas distribution industries.[27]

Concentric's Conclusions

Concentric states on p. 38 of the April report that "the declines in productivity evidenced in North American distribution utility studies are similarly evidenced based on increasing input costs and flat-to-declining outputs (e.g., Australia)." In fact, Concentric never established that the trend in North American distribution utility productivity has been negative, and the Régie chose a 0.3% X factor for HQD. Moreover, Concentric has not provided convincing evidence of a declining trend in the CNE productivity for power transmitters in this proceeding.

Other Concentric Comments

Concentric made several other comments in its X factor discussions which merit note.

- On p. 38 of its April report Concentric states that "cost of service regulation remains the standard for transmission companies in North America, but [MRI] programs for transmission companies have been developed internationally, and some have operated for multiple generations." Multiyear rate plans in Australia, Great Britain, New Zealand, and Norway are discussed. Since Concentric filed its July report, we have noted that Hydro One has proposed an MRI for an Ontario transmission utility and will propose one for its principal Ontario transmission operations next year. Thus, multiyear rate plans which extend to capital cost are widely viewed as being suitable for power transmission. PEG presented the Régie with both hybrid and indexed approaches to the design of a revenue cap for power transmission in prior testimony.

[27] AUC Proceeding No. 566, Decision 2012-237: Rate Regulation Initiative, Distribution Performance-Based Regulation, September 12, 2012, p. 85.

- Power transmission cost is not unusually difficult to benchmark. Evidently, transmission utilities in Australia, Great Britain, continental Europe, and Ontario are benchmarked using statistical methods. HQT participates in some unit cost benchmarking programs.
- A general problem with Concentric's X factor evidence is inadequate emphasis on transmission productivity targets *chosen by regulators*. This was also a problem with Concentric's evidence in the distribution MRI proceeding.
- Concentric states on p. 38 of its April report that "the goal of regulatory efficiency with transmission can be served with multiyear rate plans, or formula rates, such as that adopted by the FERC." While both of these regulatory systems do lower regulatory cost, only multiyear rate plans also have the potential to incentivize improved performance, a requirement of Québec law. Moreover, the regulatory system that the Régie has approved for HQT includes a continuation of cost of service regulation for capital cost. Hence, little reduction in regulatory cost can be anticipated from the MRI for HQT.

PEG's Base Productivity Trend Recommendation

We recommend a base productivity trend of **0.20%** for the Company's CNE revenue index. The following facts are critical to this determination.

- The X factor in HQT's *formule paramétrique* for CNE has been **2.0**% since 2014.
- Unvetted research by PSE reveals that Hydro One Transmission's annual CNE productivity growth averaged **1.07%** over the full 2005-2016 sample period considered and has accelerated in more recent years.
- Ofgem has recently used an ongoing efficiency assumption of **1.0%** for power transmitter CNE.
- Concentric reported a **0.57%** X factor using the Kahn method over the full 2009-2017 sample period. The Kahn X rose to **0.88%** when capitalized O&M expenses were excluded from the calculation.
- The AER's most recent CNE productivity growth assumption for power transmitters is **0.00%.**

- The AER's consultant has reported that the CNE productivity of Australian power transmitters averaged a **0.39%** decline for Australian power transmitters. However, the scale index used in this calculation is not ideal.
- Concentric's Kahn method research suggests that HQT's recent CNE productivity growth may have been negative. However, it is not at all clear whether this trend needs to continue.
- PSE reports that the CNE productivity of US power transmitters averaged a **0.83% annual decline** over the full 2005-2016 sample period. However, this calculation has not been vetted. Most U.S. power transmitters operate under formula rate plans that greatly weaken their cost containment incentives. Our incentive power research suggests that this may have a major productivity impact.
- The available data from Australia, Canada, and the United States do not on balance indicate a recent general decline in transmission CNE productivity.

Stretch Factor

We explained in our R-3897-2014 and R-4011-2017 reports that the stretch factor term of an X factor should reflect an expectation of how the productivity growth of the subject utility will differ from the base productivity growth target. This depends in part on how the performance incentives generated by the plan compare to those in the regulatory systems of utilities in productivity studies that are used to set the base productivity trend. It also depends on the utility's operating efficiency at the start of the MRI.

Initial operating efficiency is often assessed in MRI proceedings by statistical benchmarking studies. The methods used in these studies run the gamut from crude unit cost metrics to sophisticated econometric modelling and data envelopment analysis. In succeeding MRIs, the linkage of the stretch factor to statistical benchmarking of the utility's forward test year cost proposal can serve as an efficiency carryover mechanism that rewards the utility for achieving lasting performance gains and can penalize the utility for a failure to do so.

<u>Initial Operating Efficiency</u>

Regarding HQT's operating efficiency, we note first that the Company has not previously operated under a multiyear rate plan. Rather, it has operated under frequent rate cases for many years, a regulatory system that typically yields weak cost containment incentives. In 2017 and 2018 its cost containment incentives have been further weakened by an MTÉR.

The Régie has used a *formule paramétrique* to appraise HQT's proposed CNE for nearly a decade, but this has not had the incentive impact of a rate or revenue cap index. There is, in any event, no credible argument for setting stretch factors at zero simply because a utility has operated under an MRI. Since rate cases are still fairly frequent under most MRIs and some plans have MTÉRs, the performance incentives generated by these plans are not likely to be strong enough to eliminate the accumulated inefficiencies of subject utilities. Even if incentives provided by such caps were much stronger, it is notable that companies in competitive markets have widely varying degrees of operating efficiency. Any claim to superior operating efficiency should therefore be demonstrated empirically if a utility wishes to avoid a stretch factor.

The cost efficiency of utilities in Australia and Ontario are routinely appraised using econometric benchmarking. Hydro One has recently submitted an econometric benchmarking study of its cost efficiency in support of an Ontario transmission MRI application. This company has a large transmission system and extensive operations on the Canadian shield.

Under the Hydro-Québec Act (sections 7.2 and 20.1), the effectiveness and performance of Hydro- Québec must be assessed by an independent firm every three years, and the results of any such benchmarking studies must appear in the Company's annual reports. Benchmarking results are also discussed periodically in the Company's regulatory proceedings.

For years HQT has participated in benchmarking studies of its customer service and distribution costs which are conducted by benchmarking consultancies and the Canadian Electricity Association. The Company reports simple unit cost metrics and its general position related to the other participants in these studies but does not generally provide extensive detail. Controls for external business conditions in these studies are generally crude. Sophisticated statistical cost benchmarking studies like those considered by regulators in Ontario, Australia, and many European countries have not been presented.

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

Comparison to Incentives in Other Regulatory Systems

CNE revenue will be subject to a *formule d'indexation*. Since capital cost will not, HQT will have a perverse incentive under the plan to spend higher amounts on capex in order to profit from CNE containment. On the other hand, the MRI will have a term of only four years. An MTÉR will be included that, absent a decline in service quality, will share any surplus earnings between the Company and its customers. The plan will not have an MRE. On balance, the Company's incentives to contain cost under the MRI will be materially stronger than under the formula rate plans common in the U.S. but no stronger than that of overseas transmitters operating under MRIs.

Precedents

Table 4 of our second report in the HQD MRI proceeding presented results of a survey of stretch factors in approved North American MRIs. Here are some pertinent findings.

- Stretch factors averaged **0.29**% for electric utilities and **0.39**% for all energy utilities.
- In Ontario, stretch factors range from **0% to 0.60%** and are typically zero only for superior cost performers.
- In the first-generation MRI in Alberta, the stretch factor for all utilities was 0.20%.
- The current MRIs for gas and electric operations of Fortis in British Columbia are 0.20% and 0.10%, respectively.
- In the current MRI for Eversource Energy the stretch factor is 0.25% if growth in gross domestic product price index exceeds 2%.
- The current first-generation MRI for Ontario Power Generation the stretch factor is 0.30%.

PEG's Stretch Factor Recommendation

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.

X Factor Summary

Adding a **0.20**% stretch factor to a base productivity trend of **0.20%**, we recommend a **0.40%** X factor for the Company's CNE revenue cap index.

PMF Study

HQT disregarded the Régie's order to present its methodology for the PMF study in its 2019 *demande tarifaire.* In response to information request 1.2.1 of S.E.-AQLPA, the Company stated that it did not intend to file a draft *mandat de l'expert* with the Régie.

We believe that establishing some guidelines in advance concerning the scope and methodology for this study can encourage HQT to hire a consultant with the right expertise and to produce a constructive study. In the absence of Régie guidelines, the Company is more likely to produce an inadequate and self-serving study and then argue that requests for additional work are unreasonable.

We believe that the study should consider alternative productivity measurement methodologies and sample periods and thoroughly discuss their pros and cons. Productivity trends in the use of CNE and capital inputs should be considered as well as the trend in multifactor productivity. Productivity trends of HQT should be measured as well as productivity trends of other utilities. Hydro One's recent evidence in proceedings considering MRIs for its transmission and distribution services included estimates of its own productivity trends as well as industry trends.

A decision should also be made whether to require a statistical benchmarking study of HQT's cost level. This could be an econometric benchmarking study like that which Hydro One recently filed in Ontario. Alternatively or in addition, HQT could participate in future E3Grid studies.

Note, finally, that when HQT submits its proposed methodology intervenors should have the opportunity to comment on the proposal. This commentary should aid the Régie as it considers an appropriate response.

4. Other Revenue Cap Issues

4.1 HQT's Evidence and Proposal

Y Factor Eligibility

HQT has proposed to Y factor costs of pensions, taxes, and capitalized labor during the MRI term.

Z Factor Eligibility

The Company also seeks approval, in advance of the plan's commencement, to Z factor costs of several tasks that include replacement of the network control systems and a transmission network backup automation system, diagnosis and corrective actions required to address metal thefts and ensure ground compliance from substations, and compliance costs of North American Electric Reliability Corporation CIP standards. In Table 3 of HQT-6, Document 2, HQT shows that most costs of CIP standards compliance are CNE. CIP standards compliance may require that cybersecurity or physical security measures be undertaken. HQT incurred CIP standard compliance costs to address security concerns with laptops and flash drives that come into contact with important systems. HQT inventoried workstations and applications used on its network, developed and implemented a laptop compliance standard, developed and implemented training to ensure compliance, and implanted monitoring and correction tools to ensure that the Company remains in compliance with this standard.

HQT has also requested that the Régie approve a generic Z factor to record the cost of potential Z factors that are "unpredictable" and not integrated into the Transmitter's revenue requirement. Costs recorded in the generic Z factor would be incorporated into a neutralization account, which the Régie would review in a subsequent *dossier tarifaire* to ensure that the cost is eligible for Z factoring. If deemed eligible, the Régie would also determine how the cost should be addressed.

Materiality Thresholds

HQT supports $2.5 million materiality thresholds for Y factors and Z factors and their application as proposed by the Régie.

4.2 PEG's Response

Y Factor Eligibility

Eligible Costs

PEG has some general concerns about the Y factoring of costs in an MRI. Y factoring can weaken incentives to contain the targeted costs and raise the cost of regulation. Customers can benefit when utilities absorb risks of cost fluctuations. On the other hand, some costs are difficult to address with a revenue cap index, due in part to their sensitivity to volatile external business conditions. Y factoring costs like these can sidestep revenue cap design controversy. By reducing the utility's operating risk, Y factoring can also permit an extension of the plan term. This can strengthen performance incentives for non-tracked costs and reduce regulatory cost on balance. Y factoring costs occasioned by government directives promotes fairness. A pertinent consideration when choosing how many costs to Y factor is how much risk the utility is otherwise exposed to.

Table 1 presents information on accounts that are eligible for Y factoring in recent MRIs of North American energy utilities. It can be seen that diverse costs have been accorded Y factor treatment. Costs commonly eligible for Y factoring include those for energy procurement, upstream transmission, and conservation programs.[28] Retirement costs and taxes have been Y factored in some approved MRIs but not others.

Y factoring HQT's sizable retirement costs is a judgement call, as there are reasonable arguments on both sides. On the downside, tracking these costs weakens the Company's incentive to contain them. Since salary and wage revenue will be indexed, HQT will have some incentive to shift employee compensation from salaries and wages to retirement benefits. Review of the prudence of retirement costs is challenging enough without this complication. The decision on whether to Y factor retirement costs should also depend on the extent to which HQT's regulatory system protects the Company from other kinds of risk. The cost of service treatment of capital cost and the high share of capital cost in HQT's total cost substantially reduces the Company's operating risk. HQT also has an

[28] Some of the sampled utilities that do not Y factor costs of conservation programs do not have such programs.

unusually low risk of stranded cost since the system is chiefly used to transmit low cost power from hydroelectric generating stations.

Table 1

Approved Y Factors in Current North American MRIs[fn]

Company	Jurisdiction	Plan Term	Eligible Costs and Accounts	Citation
Eversource Energy	Massachusetts	2018-2023	Not discussed in decision. Company currently has approved riders to address the costs of DSM programs, pensions, Attorney General Consulting Expenses, pensions and post-employment benefits, state funded renewable programs, solar program, and storm reserves. A Y factor to address the costs of an enhanced vegetation management pilot program was approved in this proceeding.	DPU 17-05
All Distributors	Alberta	2018-2022	All costs that meet the AUC's Y factor criteria. To date, the following costs have been found to meet these criteria: AESO flow-through items Farm transmission costs Accounts that are a result of Commission directions (e.g., AUC assessment fees, intervener hearing costs, UCA assessment fees, AUC tariff billing and load settlement initiatives, Commission-directed Rural Electrification Associations (REA) acquisitions, effects of regulatory decisions) Income tax impacts other than tax rate changes Municipal fees Load balancing deferral accounts Weather deferral account (ATCO Gas only) Production abandonment costs	Decision 20414-D01-2016 (Errata)
Ontario Power Generation	Ontario	2017-2021	Hydroelectric Water Conditions Variance Account Ancillary Services Net Revenues Variance Account – Hydroelectric and Nuclear Sub-Accounts Hydroelectric Incentive Mechanism Variance Account Hydroelectric Surplus Baseload Generation Variance Account Income and Other Taxes Variance Account Capacity Refurbishment Variance Account Pension and OPEB Cost Variance Account Hydroelectric Deferral and Variance Over/Under Recovery Variance Account Gross Revenue Charge Variance Account Pension & OPEB Cash Payment Variance Account Pension & OPEB Cash Versus Accrual Differential Deferral Account Niagara Tunnel Project Pre-December 2008 Disallowance Variance Account	EB-2016-0152
FortisBC	British Columbia	2014-2019	Numerous costs are Y factored including pensions and other post retirement benefits, regulatory hearing costs, accounting standards changes, on-bill financing, interim rate variance	Project #3698719, Decision; September 2014
FortisBC Energy	British Columbia	2014-2019	Numerous costs are Y factored including overhead costs recovered from thermal energy customers, energy policy programs, pensions and other post-employment benefits, midstream gas costs, energy efficiency and conservation, biomethane program, hearing costs, on-bill financing, BCUC assessments, gains and losses on disposition or retirement of property	Project #3698715, Decision; September 2014
Union Gas	Ontario	2014-2018	Upstream gas and transportation costs, incremental DSM costs, LRAM volume reductions for contract rate classes, Unaccounted for Gas Volume Variances, 50% share of tax changes	EB-2013-0202
Incentive Regulation Mechanism Power Distributors except those who opt out	Ontario	2014-2018	**Group 1 includes accounts that do not require a prudence review. This group will include account balances that are cost pass-through and accounts whose original balances were approved by the Board in a previous proceeding.** Low Voltage Account Wholesale Market Service Charge Account Retail Transmission Network Charges Account Retail Transmission Connection Charge Account Power Account Global Adjustment Account **Group 2 includes accounts that require a prudence review.** Other Regulatory Assets - Sub-Account - Deferred IFRS Transition Costs Other Regulatory Assets - Sub-Account - Incremental Capital Charges Other Regulatory Assets - Sub-Account - Financial Assistance Payment and Recovery Variance - Ontario Clean Energy Benefit Act Retail Cost Variance Account Board-Approved Conservation and Demand Management Variance Account Others	EB-2010-0239, Filing Requirements For Electricity Distribution Rate Applications (Group 1), EB-2008-0046 and 2018 DVA Continuity Schedule
Hydro One Sault Ste. Marie	*Ontario*	*2019-2026*	*Renewable generation connections, system planning, and infrastructure investment resulting from the Green Energy and Green Economy Act of 2009, variances in payments in lieu of taxes paid to First Nations, Ontario Energy Board Cost Assessment Variances, and IFRS Gains and Losses on Asset Disposals*	*EB-2018-0218*

[fn] Rows in italics are proposed Y factors.

On the other hand, annual retirement costs can be quite variable due to financial market conditions that are beyond HQT's control. The labor price subindex of the inflation measure for the CNE revenue cap index tracks trends in salaries and wages in Québec but not retirement costs. The Régie has decided to Y factor retirement costs of HQD. Based on all of these considerations, PEG recommends that retirement costs should be addressed by the *formule paramétrique*.

Y factoring taxes and *coûts liés aux prestations de travail aux investissment* reduces the incentive to contain these costs. The need to contain risk is reduced by the relatively short four year term of the MRI, low stranded cost risk, and the cost of service treatment of depreciation and the return on rate base. Changes in tax rates are a risk and beyond the Company's control, but these would be potentially eligible for Z factors. Neither of these costs are Y factored in the MRI of HQD. On balance we recommend addressing these costs via the *formule paramétrique*.

Z Factor Eligibility

HQT has asked for preapproval of several specific costs for Z factor eligibility. This is an unusual proposition, and the Regie is not obliged to decide on this issue now. We agree that the *coûts liées aux normes CIP* should be eligible for Z factoring if they pass the materiality threshold, as these are occasioned by third party mandates. However, the other specifically mentioned costs should not be. We oppose the establishment of the proposed general Z factor mechanism. This would save very little time and regulatory cost and may serve to prejudge the issue of Z factor eligibility. We believe that this type of mechanism is rare in MRIs.

Materiality Thresholds

Materiality thresholds have several advantages in a system of cost trackers. These thresholds are chiefly rationalized by regulators as a means to reduce regulatory costs. If properly designed, they can also strengthen a utility's incentive to contain tracked costs and reduce overcompensation for events, such as severe storms, which are routinely encountered by utilities and reflected in the cost data used in productivity studies.

Table 2 presents information on materiality thresholds in contemporary energy utility MRIs. It can be seen that Z factors are more typically subject to materiality thresholds in the surveyed plans than

Table 2

Materiality Thresholds for Y and Z Factors[fn]

Company	Jurisdiction	Plan Term	Y Factor Materiality Threshold	Z Factor Materiality Threshold	Citation
Eversource Energy	Massachusetts	2018-2023	Some Y Factors (e.g., $1.2 million per event for the storm fund) have a materiality threshold	$5 million escalated by GDPPI for each year of the plan for each Z factor event	DPU 17-05
All Alberta Distributors	Alberta	2018-2022	Common threshold for Y factor and Z factors: Dollar value of a 40 basis point change in ROE on an after-tax basis calculated on the distribution utility's equity used to determine the final approved notional revenue requirement on which going-in rates were established (2017). This dollar amount threshold is to be escalated by I-X annually. Z factor materiality is determined on a per event basis.		Decision 20414-D01-2016 (Errata)
Ontario Power Generation	Ontario	2017-2021	O&M materiality threshold not discussed in decision, incremental capital module has threshold and deadband	$10 million	EB-2016-0152
Enmax	Alberta	2015-2017	O&M materiality threshold not discussed in decision, separate capital materiality threshold established	$1.7 million per event per year	Decision 21149-D01-2016 (Errata)
FortisBC	British Columbia	2014-2019	O&M materiality threshold not discussed in decision, separate capital materiality threshold established	0.5% of 2013 Base O&M Expense, approximately $300,000 per Z factor event	Project #3698719
FortisBC Energy	British Columbia	2014-2019	O&M materiality threshold not discussed in decision, separate capital materiality threshold established	0.5% of 2013 Base O&M Expense, approximately $1.15 million per Z factor event	Project #3698715
Union Gas	Ontario	2014-2018	O&M materiality threshold not discussed in decision, $5 million revenue requirement impact for capital projects	$ 4 million per Z factor event	EB-2013-0202
Incentive regulation mechanism power distributors except those who opt out	Ontario	2014-2018	O&M materiality threshold not discussed in decision, incremental capital module has threshold and deadband	Per Z factor event: Utility with Revenue Requirement less than or equal to $10 million: $50,000 Utility with Revenue Requirement between $10 and $200 million: 0.5% of distribution revenue requirement Utility with Revenue Requirement above $200 million: $1 million	EB-2010-0379
Hydro One Sault Ste. Marie	*Ontario*	*2019-2026*	*O&M materiality threshold not discussed in decision, incremental capital module has threshold and deadband*	*$201,277 per Z factor event (0.5% of revenue requirement)*	*EB-2018-0218*

[fn] Rows in italics have not been approved by a regulator.

Y factors. Thresholds are more common for capital cost Y factors and are sometimes substantial. It should also be noted that incentivization of cost trackers by limiting the full true up of revenue requirements to actual costs also occurs in North American regulatory systems that do not feature MRIs.[29]

A materiality threshold for HQT that is comparable to HQD's $15 million threshold using 2019 data is more than $5 million (approximately $5.57 million). HQD's 2019 RR that is subject to the revenue cap index is $2,586.5 million, while HQT's proposed 2019 base for indexing is $960.4

[29] Cost trackers are widely used in U.S. regulation today even in the absence of multiyear rate plans.

million. This calculation assumes that HQT would get all of its Y factors. If it did not, HQT's comparable materiality threshold would increase. We recommend $5 million thresholds for HQT.

These thresholds should apply on a per event basis to Z factors and to variances between Y factored costs and the corresponding revenue requirements. The first $5 million should be non-recoverable each year. These thresholds should be escalated annually by the revenue cap index.

5. *Formule Paramétrique* for Capital Cost

5.1 HQT's Evidence and Proposal

Concentric also provided some evidence on possible *formules paramétriques* for the Company's capital cost in its July reports. Precedents from Canadian power distributor MRIs were emphasized in this discussion. Concentric noted the relevance of a formula similar to those in the current MRI of FortisBC but did not develop a specific formula.

HQT proposes a formula for normalized capital cost that is broadly similar to that for the escalation of its CNE revenue. The formula is inflation less an X factor plus a growth factor. The inflation measure would be a weighted average of the growth in the EERH for all Québec industries and the $IPC^{Québec}$. The weights for these two items would be fixed at 0.45% for the labor index and 0.55% for the IPC. A 0.20% X factor is proposed that results from a Kahn Method calculation using the Company's capital cost data for the five-year 2013-2017 period. The Company shows in response to Régie information request 12.1 that similar results are obtained when taxes and *prestations de travail aux investissments* are excluded from the calculations. The proposed growth factor is the estimated capacity of the transmission network. This in turn is apparently derived from an estimate of generation capacity.

5.2 PEG's Response

PEG has the following comments on HQT's evidence.

- The FortisBC *formule paramétrique* pertains to capital expenditures, not capital cost. However, a formula of this general form can also apply to capital cost.
- Concentric mentions the "Custom IR" MRIs used by some Ontario utilities which have a C factor for supplemental capital revenue. It is important to note that the Custom IR option is available to utilities proposing capital cost growth that exceeds that which the rate or revenue cap index can provide. It is not used when a rate or revenue cap index is expected to overcompensate the utility for its capital cost.
- With respect to the inflation measure, we note that the weight for the labor price index in HQD's revenue cap index is the share of CNE labor in the total revenue requirement and

does not include any costs of labor used to achieve gross plant additions. The IPC$^{\text{Québec}}$ is the input price subindex designed to represent inflation in capital prices. It is fairly sensitive to labor price trends given the labor-intensive technologies for producing many goods and services in the economy. However, it is subject to irrelevant fluctuations in prices of agricultural and energy commodities. The GDPIPIFDD has the advantage of being insensitive to these price fluctuations.

The true price of capital is a complicated function of trends in the rate of return on capital and historical construction costs. *Statistique Canada* has suspended calculation of its Electric Utility Construction Price Index series.

- Transmission operating scale is multidimensional, so HQT's use of a single scale metric may be one reason that its *formule paramétrique* doesn't fit its cost data better. We developed an econometric model of transmission capital cost to identify additional scale variables and develop cost elasticities and elasticity weights. Data were drawn from a sample of 41 vertically-integrated U.S. electric utilities over the 1996-2016 sample period. The cost data were drawn from FERC Form 1 reports. Capital cost was measured using the geometric decay ("GD") method. The dependent variable in the research was real transmission capital cost, the ratio of nominal capital cost to a GD capital price index. Our research identified four statistically significant measures of transmission operating scale: the number of retail customers (which is highly correlated with expected peak demand), generation capacity, ratcheted peak demand, and transmission line miles. The elasticity estimates and corresponding elasticity weights are reported in the following matrix.

Variable	Estimated Cost Elasticity	Elasticity Share (%)
Number of Retail Customers	15.6%	14.8%
Generation Capacity	10.4%	9.9%
Ratcheted Peak Demand	43.8%	41.5%
Transmission Line Miles	35.8%	33.9%

Total		100%

It can be seen that the cost elasticity estimates all have the expected positive sign and plausible magnitudes. These results provide the basis for a sensible elasticity-weighted scale index. Details of the econometric research can be found in Table 3.

Table 3

Econometric Model of Transmission Capital Cost

EXPLANATORY VARIABLE	ESTIMATED COST ELASTICITY	T-STATISTIC	P Value
Number of Customers*	0.156	4.935	0.000
Transmission Line Miles*	0.358	17.217	0.000
Generation Capacity (MW)*	0.104	4.850	0.000
Ratcheted Maximum Peak Demand*	0.438	11.606	0.000
Trend*	-0.004	-3.537	0.000
Constant*	16.586	1051.522	0.000
System Rbar-Squared	0.903		
Sample Period	1996-2016		
Number of Companies	41		
Number of Observations	848		

***Estimate is significant at the 99.9% confidence level**

This model can if desired be placed in projection mode and serve as an alternative *formule paramétrique*.

Based on our research, with its limited budget, we recommend the following changes in HQT's proposed *formule paramétrique* for capital.

- The proposed inflation measure should be replaced with the GDPIPIFDD or another macroeconomic Canadian price index that is insensitive to irrelevant commodity price fluctuations.
- The formula should use the elasticity-weighted scale index that results from our econometric cost research, or at least incorporate transmission line miles with a substantial weight.
- The Kahn X factor should be recalculated to reflect these specifications.

6. Treatment of Service Quality and Surplus Earnings

6.1 HQT's Evidence and Proposal

Global Service Quality Indicator

HQT proposes to calculate a summary *indice global du maintien de la qualité du service* ("IMQ") which summarizes changes in the Company's service quality. Quality metrics would address performance in the areas of customer satisfaction, reliability, availability, and safety. The calculations would have two stages. Following a normalization of the results for individual metrics, the indicated changes in performance would be averaged.[30]

Metrics and Targets

Reliability of Service

HQT proposes two reliability metrics: *IC-Opérationel* and the number of outages leading to customer service interruptions. Targets and standard deviations for each of these metrics are calculated based on 5 years of historical data. Each metric has a 12.5% weight in the global index.

IC-Opérationel is a standardized continuity index that measures the average number of hours that the Company's service is interrupted per customer for all customers served. The only outages included in HQT's proposed metric are those directly related to current network operations. Outages that would be counted include those due to equipment failures, operating incidents, and planned outages. In response to information request 1.6.1 of S.E.-AQLPA, HQT noted that this metric would exclude outages due to various external events, including those caused by weather, wildlife, and forest fires.

The second proposed reliability indicator, the number of outages leading to customer service interruptions, is measured as the total number of events that cause a service interruption for customers. This is a measure of outage frequency which includes planned and unplanned outages.

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[30] HQT's normalization of quality metrics is based on the following formula:

$$[\,X - mean(X)] \,/\, sd(X)$$

where *X* is the value of the current value metric and mean (*X*) and *sd*(*X*) are the Company's mean and standard deviation over a certain sample period.

Availability of the Network

HQT proposes a single network availability metric: the number of forced unavailabilities. Forced unavailabilities are defined as events that create an unexpected reduction in the transmitter's delivery capacity. This metric, which has a 25% weight in the global index, includes incidents that may impact availability on the network but not result in an outage. The target for this metric would change each year and reflect aging of the network and an increased likelihood of forced outages. The standard deviation would be calculated based on the number of HQT's forced unavailabilities for each year of a recent historical 5-year period.

Customer Satisfaction

HQT proposes two metrics for customer satisfaction. These would be based on evaluations completed by point-to-point customers and representatives of HQD responsible for each sectoral agreement with HQT and the Distributor's purchase of point-to-point services.[31] The point-to-point customer satisfaction survey is sent out to the most active point-to-point customers, often resulting in fewer than 10 completed surveys. HQT has proposed 12.5% weights for each of these satisfaction metrics.

The target for the HQD customer satisfaction index is the average of 2 years of historical data (e.g., 2016 and 2017). The evaluation methodology for this index was revised in 2016, resulting in lower scores than in earlier years. The target for the point-to-point customer satisfaction index is based on 5 years of historical data. The standard deviation calculations appear to be based on data for 2011-2015 for the HQD satisfaction index and for 2013-2017 for the point-to-point customer satisfaction index.

Public and Employee Safety

HQT proposes a single metric for this performance area: the number of accidents resulting in lost work time and temporary assignments per 200,000 hours worked. HQT appears to have redefined this metric recently, as it presented data based on its actual reporting and a recalculated version for the

[31] There are 9 sectoral agreements between HQD and HQT. Each deals with a particular issue such as communications during emergencies, management of restrictions on line clearances, and planned interruptions.

most recent 5-year period. The target and variance calculations relied on the recalculated version of this metric.

Linkage to the MTÉR

HQT argues that the purpose of the service quality provisions of the MRI is to maintain quality rather than improve it. The Company further argues that some service quality variation is normal from year to year. The proposed linkage to the MTÉR is thus designed so that IMQ scores could not affect earnings unless they were worse than negative one. This is the score that would result if the deterioration in each quality metric equaled its standard deviation on average. If HQT were overearning and the global index value was between -1 and -2, the Company would forfeit one percent of its surplus earnings for every one hundredth (0.01) that the index is below -1. If the global indicator had a value of -2, all overearnings would be returned to customers. If the value of the global indicator value was worse than -2, there would be no additional effect on the Company's earnings.

6.2 PEG's Response

Here are some areas where we have concerns and comments about HQT's proposed service quality performance incentive system.

Reliability Metrics

HQT has proposed to exclude several reliability metrics that it regularly reports in its annual reports to the Régie and/or in *dossiers tarifaires*. These metrics include the average duration of planned and unplanned outages, all variants of the continuity index except the continuity index that reflects only outages directly related to network operations ("Operational Continuity Index"), Transmission SAIDI ("T-SAIDI"), Transmission SAIFI ("T-SAIFI"), and the number of incidents where an HQ employee or contractor causes damage or an outage on the network.[32] We discuss these metrics in more detail below. HQT acknowledged that only 50% of the total outage duration in 2017 was due to outages from

[32] HQT proposes to include only the normalized version of the Operational Continuity Index.

planned interruptions and equipment failures.[33] However, HQT claims that the average duration of planned and unplanned outages is dependent on major events.[34]

HQT's continuity indexes are reported in raw and normalized forms. Normalization is undertaken using the IEEE's 2.5 beta methodology. A continuity index for transmission measures the average duration of outages in hours per customer due to planned and unplanned outages on the transmission system. This index is broken down into two subindexes: the Operational Continuity Index and the continuity index for all other outages. HQT also reports continuity indexes that identify the average duration of outages in hours per customer for a variety of outage causes including equipment failures, incidents, planned outages, climatic factors, wildlife, environment, and misdeeds.

T-SAIDI is calculated by dividing the total duration of unplanned interruptions on the transmission network by the total number of delivery points. Only outages longer than 1 minute are included. T-SAIFI is calculated by dividing the total number of unscheduled interruptions by the total number of delivery points. There are two variants of T-SAIFI: one that measures sustained interruption frequency and one that measures momentary interruption frequency. An interruption must be at least 1 minute to count as a sustained interruption. In *dossiers tarifaires*, HQT presents high level results from a Canadian Electricity Association program to benchmark these metrics.

HQT stated in response to information request OC DDR 6.3 that it will continue to report the other transmission reliability indicators that it currently reports to the Régie. Thus, the marginal regulatory cost of adding one or two reliability indicators to the IMQ from this list is negligible.

HQT also reports on the number of incidents where an HQ employee or contractor causes damage or an outage to the transmission system. Only incidents rated G1 and G2 are reported. G1 incidents cause a loss of load to an internal or external customer, while G2 incidents cause a loss of equipment.

Notable Precedents

HOSSM is proposing to use the following two reliability metrics in its MRI.

[33] HQT-3, Document 2, p. 7.

[34] HQT performed in the range of 67 and 76 minutes in 3 of the 5 most recent years.

- T-SAIFI is the average number of unplanned interruptions per delivery point. Momentary and sustained interruptions are included.
- T-SAIDI is the average duration of unplanned interruptions per delivery point. Only sustained interruptions are included.

No performance incentive mechanism is proposed.

RIIO has an incentive mechanism that uses electricity not supplied as the metric. Awards are possible as well as penalties. The penalty rate is based on the estimated value of lost load. The maximum penalty on allowed revenue is 3%.

The AER also has a reliability penalty mechanismand the for transmitters. The metrics used are the number of unplanned outages per circuit, the MWh of energy not supplied from unplanned outages/MW of peak demand, and aggregate duration of unplanned outages/number of events. Rewards are available as well as penalties. Awards and penalties are capped.

Safety Metrics

The proposed employee safety metric is similar to those reported by Hydro One Transmission and various U.S. utilities. HOSSM is proposing to report a similar metric in its MRI. It is desirable that the metric be fully comparable to those reported by other North American utilities on a levels basis even though it is used in the IMQ to measure trends.

Weights

The four service quality areas carry equal weight in the calculation of the IMQ. HQT states in response to PEG DDR 8.2 that

> *Le Transporteur n'a pas cherché à prioriser un ou des champs d'intervention au détriment des autres, ou en fonction de l'importance relative de chacun*.[35]

We disagree. The weights should reflect the relative importance of the performance dimensions and the need for penalties to discourage bad performance. The four service quality areas do not deserve equal weights. For example, employee safety does not warrant the same weight as

[35] R 4058-2018, B-0067, Réponses du Transporteur, 23 October, p. 14.

reliability. HQT is already incentivized to mind its employee safety by its exposure to the risk of injury and damage expenses. Customer satisfaction does not warrant the same weight that it does in an MRI for distribution services, and HQD has a potential conflict of interest in grading the performance of HQT.

Financial Provisions

We have several concerns about the service quality performance incentive mechanism.

Linkage to the MTÉR

One concern is the linkage of measured performance to the MTÉR, which does not share earnings shortfalls. While there are good arguments for not sharing earnings shortfalls, and this issue has been resolved, linking service quality to this kind of MTÉR would weaken the Company's incentive to maintain quality in periods of underearning or slight overearnings, which can easily occur.

Maintenance and cost-effective improvement of service quality can be jeopardized under an MRI because relaxed quality effort can bolster earnings. This is a concern whether or not the utility has surplus earnings. If HQT is only marginally overearning, for example, the mechanism may not encourage the Company to maintain its service quality performance, as the cost of compliance may be larger than the forfeited revenue from poor performance.

In our experience, service quality incentives in multiyear rate plans are not typically tied to an MTÉR. HQT stated in response to OC DDR 7.1 that "*aucune utilité au delà de Gazifére lie actuellement les indicateurs de performance au MTÉR*."

Deadband

The substantial deadband in the mechanism linking the IMQ and the MTÉR is also controversial. Effectively, the Company would know that its quality metrics could decline by the amount of the standard deviation with no penalty. One of the rationales for this treatment is that service quality metrics are sensitive to volatile external business conditions. Since there are no rewards for improved quality, volatility tends to hurt HQT. However, these fluctuations should tend to balance out during the course of the plan.

Penalty Rates

HQT provides no evidence that the financial penalties it proposes for poor service quality are appropriate. It would be quite a coincidence if the appropriate penalty for a 200 basis point decline in the IMQ was to eliminate surplus earnings. Unfortunately, rough and ready methodologies are frequently used in the design of MRI performance incentive mechanisms.

Precedents

PEG has reviewed 6 U.S. service quality incentive mechanisms as well as the previously approved mechanisms in MRIs of Gaz Métro and Gazifère. Of the mechanisms outside Québec which we reviewed, only one ties performance results to earnings.[36] Instead, these mechanisms usually tie poor performance to specific revenue penalties regardless of the utility's earnings.[37] In most cases, financial incentives are tied directly to performance on individual metrics. For example, a failure to meet the customer satisfaction index target is linked to a specific penalty. Some mechanisms do incorporate deadbands to allow a utility to have a significant deterioration in performance before penalties are applied.

PEG's Alternative Service Quality Incentive Mechanism Proposal

We recommend the following revisions to HQT's proposed service quality mechanism.

- The weight on the safety metrics and the customer satisfaction surveys should each be reduced to 15%. A reliability and availability category should be established that has a 70% weight. Metrics in this category would have equal weights.
- Consideration should be paid to using T-SAIFI and T-SAIDI as reliability metrics.

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[36] This mechanism is part of Mississippi Power's retail formula rate plan. The mechanism ties service quality performance to the allowed ROE and deadband around which rates will be reset. Mississippi Power's service quality performance also affects the amount of surplus/deficit earnings which the utility is allowed to keep/absorb. Superior performance allows for a higher allowed ROE and rates will be reset to a point more favorable to the company, either increasing the surplus earnings the company may retain or reducing deficit earnings. Inferior performance results in a lower allowed ROE and rates being reset such that Mississippi Power is forced to return a greater level of surplus earnings or absorb a higher level of deficit earnings.

[37] Penalties may be expressed in dollars or as basis points of return on equity.

- There is a way to avoid a deadband in the penalization for declining quality. HQT can be subject to a revenue penalty only at the end of the plan if there is an average decline in IMQ scores on balance over the four years of the MRI term. Improvements in quality in some areas would be allowed to offset quality declines in other areas. However, HQT would receive no reward for a rise in the IMQ.

- The Régie should reconsider its decision to penalize HQT for poor quality only when the Company has surplus earnings. In principle, it can approve a supplemental revenue adjustment that doesn't conflict with its decision to link the MTÉR to service quality. Here is an example.

    - Declining service quality will reduce allowed revenue formulaically. To guard against excessive penalties, it is reasonable to place a cap (e.g. 3% of allowed revenue) on these penalties.

    - If the indicated revenue reduction for declining quality is less than HQT's share of surplus earnings under the existing MTÉR formula, the Company's share will be reduced by this amount.

    - If the indicated revenue reduction for declining quality exceeds the Company's share of surplus earnings, it will retain no surplus earnings and allowed revenue will be further reduced by the amount necessary to achieve the indicated revenue reduction.

7. Other Outstanding Issues

7.1 *Clause de Sortie*

HQT's Evidence and Proposal

HQT embraces a proposal from Concentric that the *clause de sortie* be triggered if the Company's rate of return varies by more than 150 basis points from its target in either direction. If the clause is triggered, the MRI would be suspended and HQT would return to cost of service regulation. Concentric further explained in response to PEG DDR 11.1 that

> As a practical matter, the determination that the off-ramp is triggered will not be made until May of the subsequent year when the Annual Report is filed. HQT would file a proposal for new rates based on the forecasted cost of service, with the new rates to take effect on January 1st of the next year. HQT would include a proposal on how to handle the "gap" year during which rates would continue to be established by application of the MRI formula. The Régie would make a final determination as part of the rate case review process.[38]

Concentric contributed a brief report on precedents for MTÉRs and *clauses de sortie* in other Canadian MRIs.

PEG's Response

The proposed *clause de sortie* is too conservative, especially in the event that the Company is underearning. Since HQT has shown little enthusiasm for multiyear rate plans, the Company might even be tempted to acquiesce in a year of low earnings to escape from the MRI and return to cost of service regulation. The cost of service treatment of capital makes extreme earnings outcomes much less likely than in the MRI for HQD. The relatively short four-year term of the plan, Y and Z factors, and the MTÉR also reduce the likelihood of extreme earnings outcomes.

Concentric's survey does not support its *clause de sortie* recommendation.

- In many *clauses de sortie* that Concentric surveyed, the action trigger has been larger than a 150 basis point post MTÉR earnings variance in a single year.

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[38] R 4058-2018, B-0067, Réponses du Transporteur, 23 October, p. 20.

- Several plans surveyed do not have a *clause de sortie.*
- *Clauses de sortie* do not always require suspension of the MRI and a return to cost of service regulation when action is triggered. For example, Concentric stated in response to PEG DDR 11.2 that

> Among the utilities shown in Tables 1 and 2 of our report, ENMAX (in its 2007 plan) and the Ontario utilities have provisions to either "address the issue that triggered the re-opening" or "initiate a regulatory review." Additionally, the generic PBR framework in Alberta warrants "consideration of a reopening and review of a PBR plan" when the basis point threshold is triggered. In British Columbia, before a plan is terminated it is reviewed to address potential remedies.
>
> For gas distributors, as discussed above the generic PBR framework in Alberta warrants "consideration of a reopening and review of a PBR plan" when the basis point threshold is triggered. The specifics of Alberta's PBR reopener provisions are discussed on pages 71-75 of AUC D-20414-D01-2016. The reopener is not automatic, rather it may be initiated by the company or by the Commission.
>
> In British Columbia, FEI's off ramp sets "in motion a two-stage process. The first stage consists of a process before the Commission to assess potential remedies to the situation, including the potential for amending or re-calibrating the PBR plan to allow it to continue. A second stage to the process would be triggered if satisfactory solutions could not be found through modification of the PBR plan. This stage would deal with how to exit from the plan. This could include a variety of options from going back to a cost of service methodology to a redesign of the PBR."
>
> In Ontario, Enbridge's 2008 PBR plan included a provision for the Company to file an application with the OEB for a prospective review of its adjustment formula. In Enbridge's subsequent plan, the OEB is to "monitor Enbridge's results and carry out a review if Enbridge over-earns or under-earns more than 300 basis points." [footnotes omitted][39]

[39] R 4058-2018, B-0067, Réponses du Transporteur, 23 October, p. 21.

PEG recommends a *clause de sortie* similar to that approved in Alberta wherein action is triggered when the pre-MTÉR ROE varies from its target in either direction by 400 basis points in one year or 300 basis points for two consecutive years. The Régie should then review the plan and consider whether to continue with the plan, revise it, or return to cost of service regulation. A year of cost of service regulation should not be automatic.