OSHAWA PUC NETWORKS INC.

Undertaking J2.10

To provide the PEG report on effect on OM&A of customer additions.

Response:

Please see attached commentary provided by PEG on an approach to an OM&A Growth Factor.

OM&A Cost Escalator for Oshawa PUC Networks

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Rationale

The rationale for the index-based escalator for operation, maintenance, and administration ("OM&A") expense ("COMA") which PEG Research developed for Oshawa PUC Networks ("OPUCN") starts with the well-established theoretical result that growth in OM&A expenses can be decomposed into the growth in cost-weighted OM&A input price and quantity indexes.

$$growth\ COMA = growth\ OM\&A\ Input\ Prices + growth\ OM\&A\ Input\ Quantities \quad [1]$$

Suppose, now, that we add and subtract the growth of an elasticity-weighted index of operating scale (aka an output quantity index) on the right hand side of this relation.

$$\begin{aligned} growth\ COMA &= growth\ OM\&A\ Input\ Prices \\ &\quad - (growth\ Scale - growth\ OM\&A\ Input\ Quantities) + growth\ Scale \\ &= growth\ OM\&A\ Input\ Prices - growth\ OM\&A\ Productivity \\ &\quad + growth\ Scale. \end{aligned} \quad [2]$$

The term in parentheses is, effectively, the growth in an index of the productivity of OM&A inputs. Thus, this escalator builds in an expectation of productivity growth.

Elasticity-weighted scale indexes were featured in an influential theoretical paper by Denny, Fuss, and Waverman and have been used several times by PEG Research in our work for

the Ontario Energy Board.[1] The elasticity of cost with respect to a scale variable is the percentage change in cost that would result from 1% growth in scale. The elasticities required for such a scale index can be estimated econometrically using historical data on power distributor cost and on operating scale and other cost drivers. The elasticities for formula [2] could be drawn from an OM&A cost model. A recent econometric model of OM&A expenses estimated using Ontario data is unavailable. However, the Board commissioned an econometric *total* cost model in the IRM4 proceeding in order to obtain elasticity weights, and a scale index constructed from the resultant cost elasticity estimates was used in the Board-commissioned TFP index.[2]

The following additional points concerning scale indexes are noteworthy.

- The estimates in the Board's cost model are of *long run* elasticities.
- The scale index weights appropriate for COMA would likely be similar.
- Cost is frequently driven by multiple scale variables, and a scale index appropriately captures the cost impact of multiple variables.

Econometric research on the cost of power distribution typically shows that the number of customers is the single most important scale-related cost driver. This reflects in part the fact that the number of customers is dominated by small-volume customers that tend to have peaked loads. Thus, the number of customers is highly correlated with peak load and the capacity needed to serve it. If we simplify [2] by replacing the scale index with the number of customers we can rearrange the terms to obtain

growth COMA/Customer = growth OM&A Input Prices - growth OM&A Productivity [3]

[1] Denny, Michael, Melvyn A. Fuss and Leonard Waverman (1981), "The Measurement and Interpretation of Total Factor Productivity in Regulated Industries, with an Application to Canadian Telecommunications," in Thomas Cowing and Rodney Stevenson, eds., *Productivity Measurement in Regulated Industries*, (Academic Press, New York) pages 172-218.

[2] Kaufmann, Lawrence, David Hovde, John Kalfayan, and Kaja Rebane, "Productivity and Benchmarking Research in Support of Incentive Rate Setting in Ontario: Final Report to the Ontario Energy Board," EB-2010-0379, Table 8, page 4, November 2013, and Ontario Energy Board's "Report of the Board: Rate Setting Parameters and Benchmarking under the Renewed Regulatory Framework for Ontario's Electricity Distributors," EB-2010-0379, November 2013.

If we use a scale index constructed using total cost elasticities to measure OM&A productivity, the term in parentheses in formula [2] is the partial factor productivity ("PFP") of OM&A inputs. Formula [2] is still valid if the same scale index is used in the third term of the formula.

A cost escalator based on formula [2] would have the general form

$$growth\ COMA^{OPUCN} = growth\ OM\&A\ Input\ Prices - X + growth\ Scale^{OPUCN} \quad [4]$$

We can calibrate X using the trend in the OM&A PFP of Ontario utilities and then add an appropriate stretch factor.

Application

We employed the same OM&A input price index we used to benchmark the total forecasted cost of OPUCN during its proposed rate plan.[3] As discussed in our report, the growth rate of this index is a weighted average of Conference Board forecasts of Ontario labor prices and the implicit price deflator for Canadian gross domestic product.

The growth in Oshawa's operating scale is measured using the same scale index that appears in Table 6 of the report. The growth in this scale index is a weighted average of the forecasted growth of Oshawa's customers, delivery volume, and line miles. This index was constructed using elasticity weights drawn from the Board's econometric model for OPUCN.

The X factor is the sum of a base PFP growth target for OM&A and a stretch factor. An OM&A PFP index is readily calculated from our work for the Board in IRM4, and results are reported in Table 6 of our report for OPUCN. Some adjustments to the results are needed, however, to properly capture the recent *long term* OM&A productivity trend due to changes in utility accounting practices that occurred in 2012.[4] Most notably, 13 utilities moved from a Canadian GAAP standard to an IFRS standard. This change required these utilities to suspend capitalization of certain OM&A expenses, and these expenses surged in some cases.

[3] Lowry, Mark, David Hovde, and John Kalfayan, "Benchmarking the Forecasted Cost of Oshawa PUC Networks," Ontario Energy Board EB-2014-0101, OPUCN Exhibit 10, Table 3, page 15, December 2014.
[4] Ibid, Table 6, page 19.

The following table sheds light on the problem.

Table 1

OM&A Productivity Trends of Ontario Power Distributors

	2003-2011	2003-2012
Full Sample	0.51%	-0.40%
Non-IFRS Utilities	0.17%	-0.03%
Difference	0.34%	-0.37%

From 2003-2011, it can be seen that the OM&A PFP trend of an aggregate that excluded the Non-IFRS utilities (as well as Hydro One and Toronto Hydro) was 34 basis points *less* than the trend for the aggregate used in our IRM4 research (which also excludes Hydro One and Toronto Hydro). When 2012 is added, however, the OM&A PFP trend of the non-IFRS utilities is 31 basis points *greater* than that of the aggregate. Concern about this problem was one of the reasons the Board set the base TFP growth target at zero when the industry TFP trend for the full sample considered was -0.33%.

To correct for the adoption of IFRS accounting, we started with the -0.03% TFP trend, over the full sample period, of the non-IFRS aggregate. We added to this the 0.34% basis point difference between the trends for the IRM4 aggregate and the non-IFRS aggregate over the shorter 2003-2011 period. The base productivity growth target resulting from this exercise is 0.31%.[5] To this we added the stretch factor that is indicated for Oshawa in each year of the proposed plan by our statistical benchmarking work using the Board's approved model.

Results of our calculations are reported in Table 2. It can be seen that the trend in OPUCN's forecasted OM&A expenses is well below the trend in the COMA escalator.

[5] A trend in the productivity of OM&A inputs that exceeds the trends in total factor and capital productivity is unsurprising. A recent study submitted as testimony in British Columbia found a 1.51% OM&A productivity trend for US power distributors and a 0.61% trend for capital productivity in the 2002-2011 period. See Mark Newton Lowry, David Hovde, and Kaja Rebane, "X Factor Research for Fortis PBR Plans," British Columbia Utilities Commission Projects 3698719 (FBC) and 3698715 (FEI), December 2013.

Table 2

Escalated vs. Forecasted OM&A Cost Growth for OPUCN

Year	Forecasted OM&A Input Price Growth[1]	Ontario OM&A Productivity Growth[2]	Stretch Factor	OPUCN Scale Index (growth rates)				OM&A Cost Escalator Growth	Escalated OM&A Cost	OPUCN Forecasted OM&A Cost	Forecasted OM&A Cost Growth	Annual Incremental OM&A Cost Savings	Cumulative Net OM&A Cost Savings
				Customers[3]	Delivery Volume[3]	Ratched Peak Demand[3]	Scale Index[4]						
	[A]	[B]	[C]				[D]	[E = A - (B+C) + D]	[F]	[G]		[H = F - G]	[I]
2013									10,496,484	10,496,484			
2014	1.73%	0.31%	0.30%	1.3%	1.9%	2.2%	1.56%	2.68%	10,781,921	10,490,056			
2015	1.93%	0.31%	0.30%	1.5%	1.3%	2.1%	1.60%	2.93%	11,102,016	11,493,077	9.13%	(391,061)	(391,061)
2016	2.45%	0.31%	0.30%	3.0%	1.9%	2.8%	2.77%	4.61%	11,626,296	11,960,700	3.99%	(334,404)	(725,465)
2017	2.55%	0.31%	0.30%	3.0%	1.8%	3.9%	2.98%	4.92%	12,212,584	12,240,367	2.31%	(27,783)	(753,248)
2018	2.57%	0.31%	0.15%	3.0%	1.6%	3.7%	2.92%	5.03%	12,842,765	12,436,871	1.59%	405,893	(347,355)
2019	2.55%	0.31%	0.15%	3.0%	1.7%	4.0%	2.98%	5.07%	13,510,107	12,493,799	0.46%	1,016,308	668,953
Average 2015 - 2019	**2.41%**	**0.31%**	**0.24%**	**2.67%**	**1.65%**	**3.30%**	**2.65%**	**4.51%**			**3.50%**		

1. Source: Table 3 of the PEG benchmarking report done for OPUCN.
2. Source: Calculated by PEG to adjust the 2002-2012 OM&A productivity trend calculated during the IRM-4 productivity work for the effect of the adoption of IFRS by 13 LDCs.
3. Source: Table 2 of the PEG benchmarking report done for OPUCN as updated by OPUCN staff.
4. The formula for the Scale Index Growth is 0.64 x Customer Growth + 0.147 x Delivery Growth + 0.212 x Capacity Growth. The weights are based on the relative values of the parameter estimates from the econometric model used in the PEG report.

However, the pattern over time of these savings is uneven. For the first three years of the period, the index does not cover the annual OM&A expenses anticipated by OPUCN. It is in the last two years that OPUCN expects to offset these deficits. On balance, the cumulative savings in the OPUCN proposal over and above that delivered by the indexing formula amounts to about $670,000.

Precedents

While our proposed methodology for escalating OM&A expenses hasn't been sanctioned by the Board, it is an earnest attempt to use Board-approved *component* methods to incorporate productivity growth into OM&A expense projections. Moreover, the general methodology has been reflected in a number of approved PBR plans. For example, the Board implicitly approved a formula like [3] when it approved a revenue per customer index for Enbridge Gas Distribution in 2008.[6] Revenue per customer indexes are currently used to regulate Gazifere in Quebec and three Alberta gas distributors.[7] Numerous gas and electric utilities in the United States operate under revenue per customer decoupling plans that escalate allowed revenue for the full pace of customer growth.[8] Cost per customer escalators are featured in recently approved PBR plans for the Fortis gas and electric utilities in British Columbia.[9]

Formulas like [2] with an elasticity-weighted scale index based on econometric cost research are currently used by the Australia Energy Regulator to escalate allowed OM&A expenses of gas and electric power distributors in multiyear rate plans.[10] Such formulas were previously used to escalate the OM&A expenses of gas and electric power distributors by the Essential Services Commission in the state of Victoria Australia.[11]

[6] Ontario Energy Board, EB-2007-0615, Decision, February 2008.
[7] Alberta Utilities Commission, Proceeding 566, Decision 2012-237: Rate Regulation Initiative, pages 30-32, September 2012.
[8] Lowry, Mark, Matthew Makos and Gretchen Waschbusch, "Alternative Regulation for Evolving Utility Challenges: An Updated Survey," Edison Electric Institute, January 2013.
[9] British Columbia Utilities Commission, "FortisBC Inc. Multi-Year Performance Based Ratemaking Plan for 2014 Through 2018," Decision, Project 3698719, pages 20-21 and "FortisBC Energy Inc. Multi-Year Performance Based Ratemaking Plan for 2014 Through 2018," Decision, Project 3698715, pages 19-21, September 2014.
[10] Australian Energy Regulator, "Final Decision Ausgrid distribution determination 2015-16 to 2018-19, Attachment 7," pages 286-287, April 2015.
[11] Essential Services Commission of Victoria, "Electricity Distribution Price Review 2006-10," Final Decision Volume 1 Statement of Purpose and Reasons, page 212, October 2005.

Summary

We have developed an OM&A cost escalator for OPUCN that is constructed using methodologies that have been utilized to design Board-approved PBR plans. This escalator differs from that proposed by PowerStream in its recent custom IR proposal in the following notable respects.

- Custom OM&A input price projection based on Conference Board forecasts
- Productivity adjustment, based on Ontario trends, which is appropriate for OM&A and includes a stretch factor
- Elasticity-weighted scale escalator based on the Board's approved econometric total cost model
- Solid foundation in cost theory and regulatory precedent