INTERROGATORY

Ref: PEG Report, page ii

Issue Number: 1.2 Issue: What is the method for incentive regulation that the Board should approve for each utility?

Please file a copy of the redlined version of the PEG Report that identified all changes to the June 8th draft.

RESPONSE

This is available on the Board's website. See http://www.oeb.gov.on.ca/documents/cases/EB-2006-0209/PEG_TFP_study_redlined_20070620.pdf

INTERROGATORY

Ref: PEG Report, page iii

Issue Number: 1.2 Issue: What is the method for incentive regulation that the Board should approve for each utility?

The evidence states that the notional PCI trend is quite similar to the overall trend in their actual rates during the 2000 - 2005 period. The evidence also indicates that the trend in actual rates was 0.87% for Union, as compared to the 1.34% under the price cap index.

- a) If Union's rates had increased at a trend rate of 1.34% over the 2000 through 2005 period, please provide an estimate, by year, of the incremental revenues that would have been paid to Union over this period by all customers.
- b) The price cap index of 1.34% is 54% higher than the trend figure of 0.87%. Please explain how this can be considered to be "quite similar".

<u>RESPONSE</u>

- a) We are not prepared to answer this question.
- b) The difference between the trends in the PCI and the summary rate index was 47 basis points. In our experience, the trends in the PCI and actual rates could differ by much larger amounts due to various circumstances that include the short run difference between GDPPI and the input price inflation embodied in rates.

INTERROGATORY

Ref: PEG Report, page 15

Issue Number: 4.2 Issue: How should the impact of changes in average use be calculated?

The evidence states that the average use factor can be based on long term trends much like that productivity differential and the input price differential.

a) Please define long term as used here in terms of the number of years of data used.

b) Please explain why changes in the average use in the short term are not more relevant.

RESPONSE

- a) The long term trend is one unaffected by volumetric fluctuations due to weather conditions or fluctuations in local economic activity. Normalization of the volume data gives us more flexibility in terms of a sample period for AU calculation but a period of several years is still desirable.
- b) Calculating AU factors based on short term historical trends might cause the AU to be substantially unreflective of business conditions during the IR period.

INTERROGATORY

Ref: PEG Report, Tables 13a, 13b, 15a, 15b

Issue Number: 3.1 Issue: How should the X factor be determined?

The geometric decay average annual growth rates in Tables 13a and 13b are based on an average for the years 1999-2005 while the COS approach in Table 15a and 15b are based on an average for the years 1998 – 2005.

- a) Please explain the one year difference in the period used between the methodologies.
- b) Why was the total period for which data is available in these sets of tables not used to calculate the average annual growth rates?
- c) Please provide Tables 13a, 13b, 15a, 15b and the resulting Tables 14 and 16 that would result from the use of all the data shown in this tables.

RESPONSE

- a) We seek a period that is suitable for the calculation of a long run input price differential (IPD). Reducing the sensitivity of results to fluctuations in the rate of return on capital is our paramount concern in this regard. The COS capital price is a function of the *nominal* rate of return whereas the GD capital price is a function of the *real* rate of return (the nominal rate of return less the growth rate of the asset price). The same period would control for rate of return fluctuations using both approaches to capital costing only by chance.
- b) This period would not control properly for fluctuations in the rate of return. Specifically, there was a pronounced decline in long bond yields over this period that is unlikely to continue. The consequence of this decline is that the

trend in the capital price over the longer time period is lower than what can be reasonably expected in the future.

c) Please see the attached file "LPMA Q19 attachment.pdf". In tables 13-14, we calculated the average growth rate from 1990-2005. This is the longest period for which the smoothed index results featured in the report are available using geometric decay. We also calculate average annual growth rates for 1988-2005, which is the longest available period for which unsmoothed results are available. In tables 15-16, we used all the data on the table to calculate the average annual growth rate from 1990-2005 for the COS. Reviewing the results of the revised tables, it can be seen that the use of the longer sample periods produces higher IPDs. The difference is dramatic for the GD approach but not for the COS approach.

Table 13a for LPMA #19 Input Price Index: Geometric Decay Capital Cost for Enbridge Gas Distribution

																	Summary I	ndex	
	Capit	al (Unsmo	oothed)	Capital (Real Rate	Smoothed)	_	Labour		Cos	t of Natu	al Gas	Mate	rials and S	ervices	Unsm	oothed	Smo	othed
Year	Index ⁰	Growth Rate	Weight ¹	Index ⁰	Growth Rate	Weight ¹	Index ²	Growth Rate	Weight ¹	Index ³	Growth Rate	Weight ¹	Index ⁴	Growth Rate	Weight ¹	Level	Growth Rate	Level	Growth Rate
		(%)	(%)		(%)	(%)		(%)	(%)		(%)	(%)		(%)	(%)		(%)		(%)
1988	0.10		66.7				80.1		10.7	100.2		0.0	82.2		22.6	1.00			
1989	0.08	-26.8	66.7			66.7	85.1	6.1	10.7	95.6	-4.7	0.0	86.4	5.0	22.6	0.85	-16.1		
1990	0.10	25.2	66.7	0.10		66.7	90.3	5.9	10.7	96.5	0.9	0.0	89.2	3.2	22.6	1.02	18.1	1.00	
1991	0.09	-18.9	66.7	0.09	-8.2	66.7	96.5	6.6	10.7	98.2	1.7	0.0	93.0	4.2	22.6	0.92	-10.9	0.96	-3.8
1992	0.09	6.3	66.7	0.09	4.2	66.7	100	3.6	10.7	98.4	0.2	0.0	93.2	0.2	22.6	0.96	4.6	0.99	3.2
1993	0.09	-5.1	66.7	0.09	-6.0	66.7	102.6	2.6	10.7	104.5	6.0	0.0	94.6	1.5	22.6	0.93	-2.8	0.96	-3.4
1994	0.08	-13.9	66.7	0.09	-3.3	66.7	105.7	3.0	10.7	114.8	9.4	0.0	94.7	0.1	22.6	0.85	-8.9	0.94	-1.9
1995	0.10	28.9	66.7	0.09	3.6	66.7	108.3	2.4	10.7	94.2	-19.8	0.0	96.8	2.2	22.6	1.04	20.1	0.97	3.2
1996	0.08	-27.2	66.7	0.09	-4.3	66.7	109.5	1.1	10.7	94.6	0.4	0.0	98.4	1.6	22.6	0.87	-17.6	0.95	-2.4
1997	0.08	-1.4	66.7	0.09	0.9	66.7	111.5	1.8	10.7	100.0	5.6	0.0	100.0	1.6	22.6	0.87	-0.4	0.96	1.1
1998	0.06	-18.0	66.7	0.07	-15.7	66.7	113.6	1.9	10.7	111.1	10.5	0.0	100.3	0.3	22.6	0.77	-11.7	0.87	-10.2
1999	0.10	45.5	66.7	0.08	9.4	66.7	115.4	1.6	10.7	125.7	12.3	0.0	101.0	0.7	22.6	1.05	30.7	0.93	6.6
2000	0.09	-6.0	66.7	0.09	6.7	66.7	117.9	2.1	10.7	167.6	28.8	0.0	102.7	1.7	22.6	1.02	-3.4	0.98	5.1
2001	0.13	29.5	68.7	0.11	21.5	68.7	120.8	2.4	9.5	250.1	40.0	0.0	103.9	1.2	21.8	1.25	20.4	1.13	15.1
2002	0.10	-23.2	70.0	0.11	-0.5	70.0	124.6	3.1	8.5	214.8	-15.2	0.0	106.1	2.1	21.5	1.07	-15.3	1.14	0.4
2003	0.11	12.8	67.9	0.11	6.0	67.9	127.8	2.5	8.6	225.0	4.6	0.0	107.8	1.6	23.5	1.18	9.4	1.19	4.7
2004	0.07	-41.6	63.9	0.10	-15.6	63.9	131.5	2.9	10.1	226.8	0.8	0.0	110.1	2.1	26.0	0.90	-26.6	1.09	-9.5
2005	0.08	2.3	61.9	0.09	-6.7	61.9	135.6	3.1	11.3	239.6	5.5	0.0	111.2	1.0	26.9	0.92	2.0	1.05	-3.6
Average A Growth R	Annual ate (%)																		
1999-2	005	-4.37			1.90			2.69			10.75			1.60			-2.24		2.02
1988-2 1990-2	005 005	-1.85 -1.99			NA -0.54			3.10 2.71			5.13 6.06			1.78 1.47			-0.49 NA		NA 0.30

⁰ Source: PEG calculation. See Table 12 for details.

¹ Source: Cost shares based on PEG research on Enbridge Gas Distribution.

² Source: Statistics Canada, Construction Union Wage Rate Index for Ontario with Selected Pay Supplements.

³ Source: Statistics Canada, Raw Materials Price Index for Natural Gas.

⁴ Source: Statistics Canada, Ontario GDP-IPI at Market Prices.

Table 13b for LPMA #19

Input Price Index: Geometric Decay Capital Cost for Union Gas

			_							-	_						Summar	y Index	
	Capita	al (Unsmo	oothed)	Capita	l (Real Rat	te Smoothed)		Labour	-	Cost	t of Natur	al Gas	Mater	ials and S	Services	Unsn	noothed	Smo	oothed
Year	Index ⁰	Growth	Weight ¹	Index ⁰	Growth	Weight ¹	Index ²	Growth	Weight ¹	Index ³	Growth	Weight ¹	Index ⁴	Growth	Weight ¹	Level	Growth	Level	Growth
		Rate	Ū.		Rate	C C		Rate			Rate			Rate	Ū.		Rate		Rate
		(%)	(%)		(%)	(%)		(%)	(%)		(%)	(%)		(%)	(%)		(%)		(%)
1988	0.10		62.4				80.1		21.0	100.2		1.4	82.2		15.2	1.00			
1989	0.08	-26.8	62.4				85.1	6.1	21.0	95.6	-4.7	1.4	86.4	5.0	15.2	0.86	-14.8		
1990	0.10	25.2	62.4	0.10		62.4	90.3	5.9	21.0	96.5	0.9	1.4	89.2	3.2	15.2	1.03	17.5	1.00	
1991	0.09	-18.9	62.4	0.09	-8.2	62.4	96.5	6.6	21.0	98.2	1.7	1.4	93.0	4.2	15.2	0.93	-9.7	0.97	-3.1
1992	0.09	6.3	62.4	0.09	4.2	62.4	100	3.6	21.0	98.4	0.2	1.4	93.2	0.2	15.2	0.98	4.7	1.00	3.4
1993	0.09	-5.1	62.4	0.09	-6.0	62.4	102.6	2.6	21.0	104.5	6.0	1.4	94.6	1.5	15.2	0.95	-2.3	0.97	-2.9
1994	0.08	-13.9	62.4	0.09	-3.3	62.4	105.7	3.0	21.0	114.8	9.4	1.4	94.7	0.1	15.2	0.88	-7.9	0.96	-1.3
1995	0.10	28.9	62.4	0.09	3.6	62.4	108.3	2.4	21.0	94.2	-19.8	1.4	96.8	2.2	15.2	1.06	18.6	0.99	2.8
1996	0.08	-27.2	62.4	0.09	-4.3	62.4	109.5	1.1	21.0	94.6	0.4	1.4	98.4	1.6	15.2	0.90	-16.5	0.97	-2.2
1997	0.08	-1.4	62.4	0.09	0.9	62.4	111.5	1.8	21.0	100.0	5.6	1.4	100.0	1.6	15.2	0.90	-0.2	0.98	1.2
1998	0.06	-18.0	62.4	0.07	-15.7	62.4	113.6	1.9	21.0	111.1	10.5	1.4	100.3	0.3	15.2	0.81	-10.6	0.89	-9.2
1999	0.10	45.5	62.4	0.08	9.4	62.4	115.4	1.6	21.0	125.7	12.3	1.4	101.0	0.7	15.2	1.08	29.0	0.95	6.5
2000	0.09	-6.0	62.9	0.09	6.7	62.9	117.9	2.1	20.3	167.6	28.8	2.7	102.7	1.7	14.1	1.05	-2.5	1.01	5.5
2001	0.13	29.5	65.6	0.11	21.5	65.6	120.8	2.4	18.2	250.1	40.0	2.9	103.9	1.2	13.4	1.30	20.7	1.18	15.5
2002	0.10	-23.2	64.1	0.11	-0.5	64.1	124.6	3.1	18.0	214.8	-15.2	2.5	106.1	2.1	15.4	1.12	-14.6	1.18	0.1
2003	0.11	12.8	64.5	0.11	6.0	64.5	127.8	2.5	17.6	225.0	4.6	4.1	107.8	1.6	13.8	1.23	9.1	1.24	4.7
2004	0.07	-41.6	60.3	0.10	-15.6	60.3	131.5	2.9	19.6	226.8	0.8	4.3	110.1	2.1	15.7	0.96	-25.1	1.13	-8.9
2005	0.08	2.3	58.2	0.09	-6.7	58.2	135.6	3.1	21.7	239.6	5.5	4.9	111.2	1.0	15.3	0.98	2.4	1.10	-2.9
Average Growth	Annual Rate (%)																		
1999	-2005	-4.37			1.90			2.69			10.75			1.60			-1.67		2.34
1988	-2005	-1.85			NA			3.10			5.13			1.78			-0.13		NA
1990	-2005	-1.99			-0.54			2.71			6.06			1.47			NA		0.62

⁰ Source: PEG calculation. See Table 12 for details.

¹ Source: Cost shares based on PEG research on Union Gas.

² Source: Statistics Canada, Construction Union Wage Rate Index for Ontario with Selected Pay Supplements.

³ Source: Statistics Canada, Raw Materials Price Index for Natural Gas.

⁴ Source: Statistics Canada, Ontario GDP-IPI at Market Prices.

Table 14 for LPMA #19

Input Price Differentials: Geometric Decay Capital Cost

					Input		Input Price Differentials						
		Ca	nadian E	conomy		Enbridge (Growth Rate)	Union (Gr	owth Rate)	(Economy	- Enbridge)	(Econom	y - Union)
	GDI	P-IPI ¹	М	FP ²	Estimated	Not	Real Rate	Not	Real Rate	Not	Real Rate	Not	Real Rate
	Level	Growth Rate	Level	Growth Rate	Growth Rate	Smoothed ⁴	Smoothed ⁴	Smoothed ⁵	Smoothed ⁵	Smoothed	Smoothed	Smoothed	Smoothed
		[A] (%)		[B] (%)	[C]=A+B (%)	[D] (%)	[E] (%)	[F] (%)	[G] (%)	[C]-[D] (%)	[C]-[E] (%)	[C]-[F] (%)	[C]-[G] (%)
1988	81.6		101.2										
1989	85.2	4.3	99.9	-1.3	3.0	-16.1	NA	-14.8	NA	19.1	NA	17.8	NA
1990	88.4	3.7	97.7	-2.2	1.5	18.1	NA	17.5	NA	-16.7	NA	-16.0	NA
1991	91.4	3.3	95.0	-2.8	0.5	-10.9	-3.8	-9.7	-3.1	11.5	4.4	10.3	3.6
1992	93.0	1.7	95.9	0.9	2.7	4.6	3.2	4.7	3.4	-1.9	-0.6	-2.0	-0.7
1993	94.9	2.0	96.3	0.4	2.4	-2.8	-3.4	-2.3	-2.9	5.2	5.8	4.7	5.3
1994	96.3	1.5	99.0	2.8	4.2	-8.9	-1.9	-7.9	-1.3	13.1	6.1	12.1	5.5
1995	97.4	1.1	99.5	0.5	1.6	20.1	3.2	18.6	2.8	-18.4	-1.5	-17.0	-1.2
1996	98.5	1.1	98.7	-0.8	0.3	-17.6	-2.4	-16.5	-2.2	18.0	2.7	16.8	2.5
1997	100.0	1.5	100.0	1.3	2.8	-0.4	1.1	-0.2	1.2	3.2	1.7	3.0	1.6
1998	101.3	1.3	101.1	1.1	2.4	-11.7	-10.2	-10.6	-9.2	14.1	12.6	13.0	11.6
1999	102.6	1.3	103.5	2.3	3.6	30.7	6.6	29.0	6.5	-27.1	-3.0	-25.4	-2.8
2000	105.0	2.3	106.1	2.5	4.8	-3.4	5.1	-2.5	5.5	8.2	-0.3	7.3	-0.7
2001	106.8	1.7	106.7	0.6	2.3	20.4	15.1	20.7	15.5	-18.2	-12.8	-18.4	-13.3
2002	109.3	2.3	108.9	2.0	4.4	-15.3	0.4	-14.6	0.1	19.7	4.0	18.9	4.2
2003	110.8	1.4	109.0	0.1	1.5	9.4	4.7	9.1	4.7	-7.9	-3.3	-7.6	-3.2
2004	112.7	1.7	109.5	0.5	2.2	-26.6	-9.5	-25.1	-8.9	28.8	11.7	27.2	11.0
2005	114.7	1.8	110.0	0.5	2.3	2.0	-3.6	2.4	-2.9	0.2	5.9	-0.1	5.2
Average Annual Growth Rate (%)													
1999-2005		1.86		1.02	2.88	-2.24	2.02	-1.67	2.34	5.13	0.86	4.55	0.54
1988-2005		2.00		0.49	2.50	-0.49	NA	-0.13	NA	2.99	NA	2.62	NA
1990-2005		1.74		0.79	2.53	NA	0.30	NA	0.62	NA	2.23	NA	1.91

¹Source: Statistics Canada, GDP-IPI, Final Domestic Demand for Canada.

²Source: Statistics Canada, Multifactor productivity of aggregate business sector

³ The MFP level and growth rates for 2005 were imputed using the 2004 MFP Growth Rate due to a lack of data.

⁴ See Tables 12 and 13a for details of calculations and the index level for Enbridge.

⁵ See Tables 12 and 13b for details of calculations and the index level for Union.

Table 15a for LPMA #19 and #29

Input Price Index with COS Capital Cost: Enbridge Gas Distribution

	Capital (COSR Method)			Labour			Natural Gas			Materials and Services			Summary Index		
	Index ⁰	Growth Rate	Weight ¹	Index ²	Growth Rate	Weight ¹	Index ³	Growth Rate	Weight ¹	Index ⁴	Growth Rate	Weight ¹	Index	Growth Rate	
Year		(%)	(%)		(%)	(%)		(%)	(%)		(%)	(%)		(%)	
1990	0.0569		65.3	90.3		11.1	96.5		0.0	89.2		23.6	1.000		
1991	0.0564	-0.9	65.3	96.5	6.6	11.1	98.2	1.7	0.0	93.0	4.2	23.6	1.011	1.1	
1992	0.0629	10.9	65.3	100	3.6	11.1	98.4	0.2	0.0	93.2	0.2	23.6	1.090	7.5	
1993	0.0632	0.5	65.3	102.6	2.6	11.1	104.5	6.0	0.0	94.6	1.5	23.6	1.101	1.0	
1994	0.0684	7.9	65.3	105.7	3.0	11.1	114.8	9.4	0.0	94.7	0.1	23.6	1.164	5.5	
1995	0.0692	1.2	65.3	108.3	2.4	11.1	94.2	-19.8	0.0	96.8	2.2	23.6	1.182	1.6	
1996	0.0698	0.9	65.3	109.5	1.1	11.1	94.6	0.4	0.0	98.4	1.6	23.6	1.195	1.1	
1997	0.0661	-5.5	65.3	111.5	1.8	11.1	100.0	5.6	0.0	100.0	1.6	23.6	1.159	-3.0	
1998	0.0643	-2.6	65.3	113.6	1.9	11.1	111.1	10.5	0.0	100.3	0.3	23.6	1.142	-1.4	
1999	0.0792	20.8	65.3	115.4	1.6	11.1	125.7	12.3	0.0	101.0	0.7	23.6	1.313	13.9	
2000	0.0798	0.7	65.3	117.9	2.1	11.1	167.6	28.8	0.0	102.7	1.7	23.6	1.328	1.1	
2001	0.0901	12.1	64.4	120.8	2.4	10.8	250.1	40.0	0.0	103.9	1.2	24.8	1.445	8.4	
2002	0.0805	-11.3	65.6	124.6	3.1	9.7	214.8	-15.2	0.0	106.1	2.1	24.7	1.354	-6.5	
2003	0.0823	2.2	61.8	127.8	2.5	10.3	225.0	4.6	0.0	107.8	1.6	28.0	1.382	2.1	
2004	0.0851	3.4	60.7	131.5	2.9	11.0	226.8	0.8	0.0	110.1	2.1	28.2	1.424	3.0	
2005	0.0802	-6.0	60.3	135.6	3.1	11.8	239.6	5.5	0.0	111.2	1.0	28.0	1.382	-3.0	
Average Annual Growth Rates															
(%)															
1998-2005		3.15			2.53			10.98			1.47			2.72	
1997-2005		2.43			2.45			10.92			1.33			2.20	
1990-2005		2.29			2.71			6.06			1.47			2.16	

⁰ PEG calculation using Enbridge plant data.

¹Weights based on research for Enbridge Gas Distribution.

² Source: Statistics Canada, Construction Union Wage Rate Index with Selected Pay Supplements.

³ Source: Statistics Canada, Raw Materials Price Index for Natural Gas.

⁴ Source: Statistics Canada, Ontario GDP-IPI at Market Prices.

Table 15b for LPMA #19 and #29

Input Price Index with COS Capital Cost: Union Gas

	Capital (COSR Method)		Labour			Natural Gas			Mater	ials and S	Summary Index			
	Index ⁰	Growth Rate	Weight ¹	Index ²	Growth Rate	Weight ¹	Index ³	Growth Rate	Weight ¹	Index ⁴	Growth Rate	Weight ¹	Index	Growth Rate
Year		(%)	(%)		(%)	(%)		(%)	(%)		(%)	(%)		(%)
1990	0.0604		54.0	90.3		31.7	96.5		1.7	89.2		12.6	1.000	
1991	0.0604	0.0	54.0	96.5	6.6	31.7	98.2	1.7	1.7	93.0	4.2	12.6	1.027	2.64
1992	0.0654	8.0	54.0	100	3.6	31.7	98.4	0.2	1.7	93.2	0.2	12.6	1.085	5.49
1993	0.0654	-0.1	54.0	102.6	2.6	31.7	104.5	6.0	1.7	94.6	1.5	12.6	1.096	1.03
1994	0.0704	7.5	54.0	105.7	3.0	31.7	114.8	9.4	1.7	94.7	0.1	12.6	1.154	5.16
1995	0.0719	2.1	54.0	108.3	2.4	31.7	94.2	-19.8	1.7	96.8	2.2	12.6	1.175	1.82
1996	0.0717	-0.3	54.0	109.5	1.1	31.7	94.6	0.4	1.7	98.4	1.6	12.6	1.180	0.43
1997	0.0668	-7.1	54.0	111.5	1.8	31.7	100.0	5.6	1.7	100.0	1.6	12.6	1.146	-2.94
1998	0.0644	-3.6	54.4	113.6	1.9	29.7	111.1	10.5	0.9	100.3	0.3	14.9	1.132	-1.22
1999	0.0786	19.9	58.8	115.4	1.6	23.0	125.7	12.3	1.5	101.0	0.7	16.6	1.276	11.93
2000	0.0791	0.7	60.0	117.9	2.1	21.9	167.6	28.8	2.9	102.7	1.7	15.2	1.298	1.78
2001	0.0892	12.0	60.0	120.8	2.4	21.1	250.1	40.0	3.3	103.9	1.2	15.5	1.423	9.15
2002	0.0799	-11.1	61.5	124.6	3.1	19.3	214.8	-15.2	2.7	106.1	2.1	16.5	1.337	-6.23
2003	0.0815	2.0	57.3	127.8	2.5	21.2	225.0	4.6	4.9	107.8	1.6	16.6	1.366	2.16
2004	0.0841	3.1	55.5	131.5	2.9	22.0	226.8	0.8	4.8	110.1	2.1	17.6	1.405	2.79
2005	0.0792	-6.1	54.7	135.6	3.1	23.5	239.6	5.5	5.3	111.2	1.0	16.5	1.374	-2.21
Average Growth R	Annual ates (%)													
1998-2	2005	2.94			2.53			10.98			1.47			2.77
1997-2	2005	2.11			2.45			10.92			1.33			2.27
1990-2	2005	1.80			2.71			6.06			1.47			2.12

⁰ PEG calculation using Union plant data.

¹Weights based on research for Union Gas

² Source: Statistics Canada, Construction Union Wage Rate Index with Selected Pay Supplements.

³ Source: Statistics Canada, Raw Materials Price Index for Natural Gas.

⁴ Source: Statistics Canada, Ontario GDP-IPI at Market Prices.

Table 16 for LPMA #19

Input Price Differentials with COS Capital Cost

	Canadian Economy							Ontario Ga		Input Price Differential		
-	GI	DP-IPI ¹		MFP ²	Imp	olied IPI	Er	ıbridge ⁴	τ	Jnion ⁵		
-	Level	Growth Rate [A] (%)	Level	Growth Rate [B] (%)	Index	Growth Rate [C]=A+B (%)	Index	Growth Rate [D] (%)	Index	Growth Rate [E] (%)	Enbridge [C]-[D] (%)	Union [C]-[E] (%)
1990	88.4		97.7		1.00		1.00		1.00			
1991	91.4	3.3	95.0	-2.8	1.01	0.5	1.01	1.1	1.03	2.6	-0.6	-2.1
1992	93.0	1.7	95.9	0.9	1.03	2.7	1.09	7.5	1.08	5.5	-4.9	-2.8
1993	94.9	2.0	96.3	0.4	1.06	2.4	1.10	1.0	1.10	1.0	1.4	1.4
1994	96.3	1.5	99.0	2.8	1.10	4.2	1.16	5.5	1.15	5.2	-1.3	-0.9
1995	97.4	1.1	99.5	0.5	1.12	1.6	1.18	1.6	1.18	1.8	0.1	-0.2
1996	98.5	1.1	98.7	-0.8	1.13	0.3	1.19	1.1	1.18	0.4	-0.8	-0.1
1997	100.0	1.5	100.0	1.3	1.16	2.8	1.16	-3.0	1.15	-2.9	5.9	5.8
1998	101.3	1.3	101.1	1.1	1.19	2.4	1.14	-1.4	1.13	-1.2	3.8	3.6
1999	102.6	1.3	103.5	2.3	1.23	3.6	1.31	13.9	1.28	11.9	-10.3	-8.3
2000	105.0	2.3	106.1	2.5	1.29	4.8	1.33	1.1	1.30	1.8	3.7	3.0
2001	106.8	1.7	106.7	0.6	1.32	2.3	1.44	8.4	1.42	9.1	-6.1	-6.9
2002	109.3	2.3	108.9	2.0	1.38	4.4	1.35	-6.5	1.34	-6.2	10.8	10.6
2003	110.8	1.4	109.0	0.1	1.40	1.5	1.38	2.1	1.37	2.2	-0.6	-0.7
2004	112.7	1.7	109.5	0.5	1.43	2.2	1.42	3.0	1.40	2.8	-0.8	-0.6
2005	114.7	1.76	110.0 3	0.5	1.46	2.3	1.38	-3.0	1.37	-2.2	5.2	4.5
Average												
Annual Growth												
Rates (%)												
1998-2005 [F]		1.77		1.21		2.99		2.72		2.77	0.27	0.22
1997-2005 [G]		1.71		1.20		2.91		2.20		2.27	0.71	0.64
1990-2005		1.74		0.79		2.53		2.16		2.12	0.37	0.41
									Average o	f [F] and [G]	0.49	0.43

Average of [F] and [G] 0.49

¹ Source: Statistics Canada, GDP-IPI, Final Domestic Demand, for Canada.

² Source: Statistics Canada, Multifactor Productivity of Aggregate Business Sector
 ³ The MFP level and growth rate for 2005 were imputed using the 2004 MFP growth rate due to a lack of data.
 ⁴ Source: See Table 15a for details of calculations.

⁵Source: See Table 15b for details of calculations.

INTERROGATORY

Ref: PEG Report, Table 16

Issue Number: 3.1 Issue: How should the X factor be determined?

Please provide the Statistics Canada source and definition of the MFP data used in this table.

RESPONSE

The source of the MFP data was Table 383-0016. The multifactor productivity measures the efficiency with which all inputs are used in production. It is measured residually: the growth of real output vs. the growth of combined inputs. For the actual MFP data used in the report, please see our response to EGD question 2.

INTERROGATORY

Ref: PEG Report

Issue Number: 3.1 Issue: How should the X factor be determined?

All of the Statistics Canada data reference in the report and shown in the various tables appears to have 1997 as the base year equal to 100. Current Statistics Canada data, including that for GDPIPI have been revised to a base year of 2002. This may mean that the data used by PEG has also since been revised by Statistics Canada.

Please update the analysis and all tables to reflect the most recent Statistics Canada data available.

<u>RESPONSE</u>

There have been changes in only one of the Statistics Canada data series used in our study: The Aggregate Business Sector Multifactor Productivity Series. The series found in PEG's report was discontinued, and the equivalent current series was given a 2002 base year. Please see the attached file "LPMA Q22 attachment.pdf" for updated versions of tables 14, 16 and unnumbered tables within the text of the report. It can be seen that use of the new MFP series would lower the input price differential and raise the productivity differential. However, the changes would be exactly offsetting so that the X factor would be unaffected.

No other Statistics Canada series used in our report was subject to rebasing or any other change. A possible source of confusion is that GDPIPI is calculated separately in two different accounts: The Provincial Economic Accounts use base year 1997¹; and the National Income and Expenditure Accounts, which

¹ Provincial Economic Accounts (PEA), Statistics Canada Table 384-0036.

have a base year of 2002². PEG used the PEA figures for both Ontario and Canada GDPIPI measures.

² National Income and Expenditure Accounts (NIEA), Statistics Canada Table 380-0056.

Input Price Differentials: Geometric Decay Capital Cost

				Input 1		Input Price Differentials						
	Car	nadian Ee	conomy		Enbridge (Growth Rate)	Union (Gr	owth Rate)	(Economy	- Enbridge)	(Economy	y - Union)
GDI	P-IPI ¹	M	FP^2	Estimated	Not	Real Rate	Not	Real Rate	Not	Real Rate	Not	Real Rate
Level	Growth Rate	Level	Growth Rate	Growth Rate	Smoothed ³	Smoothed ³	Smoothed ⁴	Smoothed ⁴	Smoothed	Smoothed	Smoothed	Smoothed
	[A] (%)		[B] (%)	[C]=A+B (%)	[D] (%)	[E] (%)	[F] (%)	[G] (%)	[C]-[D] (%)	[C]-[E] (%)	[C]-[F] (%)	[C]-[G] (%)
81.6		96.3										
85.2	4.3	95.2	-1.1	3.2	-16.1	NA	-14.8	NA	19.3	NA	17.9	NA
88.4	3.7	93.4	-1.9	1.8	18.1	NA	17.5	NA	-16.4	NA	-15.7	NA
91.4	3.3	90.9	-2.7	0.6	-10.9	-3.8	-9.7	-3.1	11.6	4.5	10.4	3.7
93.0	1.7	91.3	0.4	2.2	4.6	3.2	4.7	3.4	-2.4	-1.1	-2.5	-1.2
94.9	2.0	92.2	1.0	3.0	-2.8	-3.4	-2.3	-2.9	5.8	6.4	5.3	5.9
96.3	1.5	94.5	2.5	3.9	-8.9	-1.9	-7.9	-1.3	12.8	5.8	11.8	5.2
97.4	1.1	94.6	0.1	1.2	20.1	3.2	18.6	2.8	-18.8	-1.9	-17.4	-1.6
98.5	1.1	93.7	-1.0	0.2	-17.6	-2.4	-16.5	-2.2	17.8	2.6	16.7	2.4
100.0	1.5	94.9	1.3	2.8	-0.4	1.1	-0.2	1.2	3.1	1.7	2.9	1.5
101.3	1.3	95.6	0.7	2.0	-11.7	-10.2	-10.6	-9.2	13.8	12.2	12.7	11.2
102.6	1.3	97.5	2.0	3.2	30.7	6.6	29.0	6.5	-27.4	-3.3	-25.8	-3.2
105.0	2.3	99.7	2.2	4.5	-3.4	5.1	-2.5	5.5	8.0	-0.6	7.1	-1.0
106.8	1.7	99.3	-0.4	1.3	20.4	15.1	20.7	15.5	-19.1	-13.8	-19.4	-14.2
109.3	2.3	100.0	0.7	3.0	-15.3	0.4	-14.6	0.1	18.3	2.6	17.6	2.9
110.8	1.4	99.5	-0.5	0.9	9.4	4.7	9.1	4.7	-8.5	-3.8	-8.2	-3.8
112.7	1.7	99.1	-0.4	1.3	-26.6	-9.5	-25.1	-8.9	27.9	10.8	26.4	10.2
114.7	1.8	99.3	0.5	2.3	2.0	-3.6	2.4	-2.9	0.2	5.9	-0.1	5.2
	1.86		0.35	2.21	-2.24	2.02	-1.67	2.34	4.46	0.19	3.88	-0.13
	GDI Level 81.6 85.2 88.4 91.4 93.0 94.9 96.3 97.4 98.5 100.0 101.3 102.6 105.0 106.8 109.3 110.8 112.7 114.7	Car GDP-IPI ¹ Growth Level Rate [A] (%) 81.6 85.2 4.3 88.4 3.7 91.4 3.3 93.0 1.7 94.9 2.0 96.3 1.5 97.4 1.1 98.5 1.1 100.0 1.5 101.3 1.3 102.6 1.3 105.0 2.3 106.8 1.7 109.3 2.3 110.8 1.4 112.7 1.7 114.7 1.8	$\begin{tabular}{ c c c c c } \hline Canadian Editer & Canadian Editer & GDP-IPI^1 & Mi & Growth & Level & Rate & Level & [A] & (\%) & & & & & \\ \hline & & & & & & & & \\ \hline & & & &$	$\begin{tabular}{ c c c c c c c } \hline Canadian Economy \\ \hline GDP-IPI^1 & MFP^2 \\ \hline Growth & Growth \\ \hline Level & Rate & Level & Rate \\ & [A] & [B] \\ & (\%) & (\%) \\ \hline & (\%) & (\%) \\ \hline & 81.6 & 96.3 \\ \hline & 85.2 & 4.3 & 95.2 & -1.1 \\ \hline & 88.4 & 3.7 & 93.4 & -1.9 \\ \hline & 91.4 & 3.3 & 90.9 & -2.7 \\ \hline & 93.0 & 1.7 & 91.3 & 0.4 \\ \hline & 94.9 & 2.0 & 92.2 & 1.0 \\ \hline & 96.3 & 1.5 & 94.5 & 2.5 \\ \hline & 97.4 & 1.1 & 94.6 & 0.1 \\ \hline & 98.5 & 1.1 & 93.7 & -1.0 \\ \hline & 100.0 & 1.5 & 94.9 & 1.3 \\ \hline & 101.3 & 1.3 & 95.6 & 0.7 \\ \hline & 102.6 & 1.3 & 97.5 & 2.0 \\ \hline & 105.0 & 2.3 & 99.7 & 2.2 \\ \hline & 106.8 & 1.7 & 99.3 & -0.4 \\ \hline & 109.3 & 2.3 & 100.0 & 0.7 \\ \hline & 110.8 & 1.4 & 99.5 & -0.5 \\ \hline & 112.7 & 1.7 & 99.1 & -0.4 \\ \hline & 114.7 & 1.8 & 99.3 & 0.5 \\ \hline \hline \end{tabular}$	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Input Price Indexes Canadian Economy Enbridge (Growth Rate) Union (Growth Rate) GDP-IPI ¹ MFP ² Estimated Not Real Rate Not Real Rate Growth Growth Growth Rate Not Real Rate [A] [B] [C]=A+B [D] [E] [F] [G] (%)	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	

¹Source: Statistics Canada, GDP-IPI, Final Domestic Demand for Canada.

²Source: Statistics Canada, Multifactor productivity of aggregate business sector

³ See Tables 12 and 13a for details of calculations and the index level for Enbridge.

⁴ See Tables 12 and 13b for details of calculations and the index level for Union.

Input Price Differentials with COS Capital Cost

			Cana	dian Economy				Ontario Gas		Input Price Differential		
-	GI	OP-IPI ¹		MFP ²	Imp	lied IPI	Er	lbridge ³	τ	Jnion ⁴		
-	Level	Growth Rate	Level	Growth Rate	Index	Growth Rate	Index	Growth Rate	Index	Growth Rate	Enbridge	Union
		[A]		[B]		[C]=A+B		[D]		[E]	[C]-[D]	[C]-[E]
		(%)		(%)		(%)		(%)		(%)	(%)	(%)
1990	88.4		93.4		1.00		1.00		1.00			
1991	91.4	3.3	90.9	-2.7	1.01	0.6	1.01	1.1	1.03	2.6	-0.5	-2.0
1992	93.0	1.7	91.3	0.4	1.03	2.2	1.09	7.5	1.08	5.5	-5.4	-3.3
1993	94.9	2.0	92.2	1.0	1.06	3.0	1.10	1.0	1.10	1.0	2.0	2.0
1994	96.3	1.5	94.5	2.5	1.10	3.9	1.16	5.5	1.15	5.2	-1.6	-1.2
1995	97.4	1.1	94.6	0.1	1.12	1.2	1.18	1.6	1.18	1.8	-0.3	-0.6
1996	98.5	1.1	93.7	-1.0	1.12	0.2	1.19	1.1	1.18	0.4	-0.9	-0.3
1997	100.0	1.5	94.9	1.3	1.15	2.8	1.16	-3.0	1.15	-2.9	5.8	5.7
1998	101.3	1.3	95.6	0.7	1.17	2.0	1.14	-1.4	1.13	-1.2	3.5	3.2
1999	102.6	1.3	97.5	2.0	1.21	3.2	1.31	13.9	1.28	11.9	-10.7	-8.7
2000	105.0	2.3	99.7	2.2	1.27	4.5	1.33	1.1	1.30	1.8	3.4	2.8
2001	106.8	1.7	99.3	-0.4	1.28	1.3	1.44	8.4	1.42	9.1	-7.1	-7.8
2002	109.3	2.3	100.0	0.7	1.32	3.0	1.35	-6.5	1.34	-6.2	9.5	9.2
2003	110.8	1.4	99.5	-0.5	1.34	0.9	1.38	2.1	1.37	2.2	-1.2	-1.3
2004	112.7	1.7	99.1	-0.4	1.35	1.3	1.42	3.0	1.40	2.8	-1.7	-1.5
2005	114.7	1.76	99.3	0.5	1.38	2.3	1.38	-3.0	1.37	-2.2	5.2	4.5
Average												
Annual Growth												
Rates (%)		1 77		0.50		2.24		2.52			0.26	0.41
1998-2005		1.77		0.59		2.36		2.72		2. 77	-0.36	-0.41

¹ Source: Statistics Canada, GDP-IPI, Final Domestic Demand, for Canada.

² Source: Statistics Canada, Multifactor Productivity of Aggregate Business Sector

⁴ Source: See Table 15a for details of calculations.

⁵Source: See Table 15b for details of calculations.

Revenue Cap Indexes

	Enbridge	Union
Productivity Differential [A]	1.51	1.14
Input Price Differential [B]	-0.36	-0.41
Stretch Factor [C]	0.50	0.50
X Factor ^{RCI} [D=A+B+C]	1.66	1.24
Output Growth [E]	2.83	1.92
GDPIPI [F]	1.86	1.86
Indicated RCI Growth [F-D+E]	3.03	2.54^{3}

It can be seen that the RCIs grow more rapidly than the corresponding PCIs. This is due chiefly to the fact that an RCI is designed to compensate the utility for its *cost* trend rather than its *unit* cost trend.

Input Price Differential

We compared the input price trends of Ontario gas utilities to that of Canada's economy using both capital costing methods. We chose the 1998-2005 period as the one ending in 2005 that was well suited for calculating the IPD using COS capital costing. We found that the appropriate input price differentials for Enbridge and Union were -0.36% and -0.41% respectively. This is to say that the trend in the economy's input prices was a little more rapid than the trend in the industry's.

Productivity Differential

We compared the productivity trends of Enbridge and Union (*i.e.*, company specific TFP trends) to the trends of US gas utilities in an effort to ascertain appropriate TFP targets. The chosen targets were compared to the multifactor productivity ("MFP") trends of the Canadian private business sector to calculate the PDs for each company. Under the COS approach to capital costing the annual TFP growth of Enbridge and Union averaged 0.71% and 1.87% respectively. The productivity of Enbridge in the use of operating and maintenance ("O&M") inputs slowed materially in 2003 upon the expiration of the multi-

³ The actual trend in the index would depend, once again, on actual GDPIPI FDD growth during the plan.



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reasonable, and can place incentive regulation of Ontario's gas utilities on a solid foundation of economic reasoning and empirical research.

Key Results

The following table details our proposals for the X factors of the summary PCIs. It also provides, in italics, a notion of the likely growth in these PCIs during the IR plan. This projection requires an assumption regarding GDPIPI growth, and we use for this purpose the recent historical trend. The growth in the *actual* PCI would reflect the growth in the actual GDPIPI for final domestic demand during the IR plan period. The table presents, finally, indexes computed by PEG of the trend in each company's rates during the 2000-2005 period.

	Enbridge	Union
Productivity Differential	1.51	1.14
Input Price Differential	-0.36	-0.41
Average Use Factor	-0.81	-0.72
Stretch Factor	0.50	0.50
X Factor [A = sum of above]	0.85	0.52
Recent GDPIPI Trend [B]	1.86	1.86
PCI [B-A]	1.01	1.34
Summary Rate Trends	1.37	0.87

Summary Price Cap Indexes

It can be seen that, for both companies, PCI growth would be materially slower than the growth in the GDPIPI. Ontario gas consumers would, in other words, experience growth in rates for gas utility services that are below the general inflation in the prices of final goods and services in Canada. The higher X for Enbridge is chiefly due to its greater opportunities to realize scale economies. The notional PCI trend is, for each company, quite similar to the overall trend in their actual rates during the 2000-2005 period.

Here are some details of our recommendations for the PCIs for individual service groups. Separate PCIs have been designed for each rate class that includes residential service. The rates for all other services would be subject to common but company specific



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	GD Cap	ital Cost	t COS Capital Cost				
	Enbridge	Union	Enbridge	Union			
TFP ^{Industry} [A]	1.91	1.46	2.10	1.73			
TFP ^{Economy} [B]	0.35	0.35	0.59	0.59			
PD [C=A-B]	1.56	1.11	1.51	1.14			
Input Prices ^{Economy} [D]	2.21	2.21	2.36	2.36			
Input Prices ^{Industry} [E]	2.02	2.34	2.72	2.77			
IPD [F=D-E]	0.19	-0.13	-0.36	-0.41			
Output ^{Revenue-Weighted} [G]	2.02	1.20	2.02	1.20			
Output ^{Elasticity-Weighted} [H]	2.74	1.83	2.83	1.92			
AU [I=G-H]	-0.72	-0.63	-0.81	-0.72			
Stretch [J]	0.50	0.50	0.50	0.50			
X [K=C+F+I+J]	1.53	0.85	0.85	0.52			
GDPIPI FDD [L]	1.86	1.86	1.86	1.86			
Notional PCI growth [L-K] 0.33	1.01	1.01	1.34			

Price Cap Index Details

It can be seen that, for both companies, the growth of the PCIs based on the recommended COS approach to capital costing would be materially slower than the growth in the GDPIPI. Ontario gas consumers would, in other words, experience growth in rates for gas utility services that are below the general inflation in the prices of final goods and services in Canada. The higher X for Enbridge is chiefly due to its greater opportunities to realize scale economies. Note, finally, that the notional PCI trend for each company is similar to the trend in their actual rates during the 2000-2005 period.

3.8 **Price Caps for Service Groups**

We propose that any PCI designed for a specific service group have a GDPIPI-X growth rate formula in which the X factor is the sum of the X factor for the *summary* PCI and a special adjustment factor ("ADJ") that is specific to the service group and effectively customizes the X factor for the group. We recommend that there be separate PCIs for each



Our research permits an implementation of this formula. Illustrative results appear in the table below. To help stakeholders gauge the likely outcome of an RCI, we also provide, in italics, a notion of how one might rise if the output and GDPIPI terms of the formula grow at their average annual growth rates over the 2000-2005 period.

	GD Capi	ital Cost	t COS Capital Cost			
	Enbridge	Union	Enbridge	Union		
TFP ^{Industry} [A]	1.91	1.46	2.10	1.73		
TFP ^{Economy} [B]	0.35	0.35	0.59	0.59		
PD [C=A-B]	1.56	1.11	1.51	1.14		
Input Prices ^{Economy} [D]	2.21	2.21	2.36	2.36		
Input Prices ^{Industry} [E]	2.02	2.34	2.72	2.77		
IPD [F=D-E]	0.19	-0.13	-0.36	-0.41		
Stretch [G]	0.50	0.50	0.50	0.50		
\mathbf{X}^{RCI} [H=C+F+I]	2.25	1.48	1.66	1.24		
Output ^{Elasticity-Weighted} [I]	2.74	1.83	2.83	1.92		
GDPIPI [J]	1.86	1.86	1.86	1.86		
Indicated RCI Growth [J-H+I]	2.35	2.21	3.03	2.54		

Revenue Cap Index Details

In this calculation, the output index is assumed to have the same form as the elasticityweighted indexes used in our TFP calculations.³⁵ This approach has the advantage of being applicable to both Union, with its large transmission volumes, and Enbridge. The growth rate of the GDPIPI is set at the 1.86% average annual rate achieved from 1999 to 2005. It can be seen that, despite material differences in the operating conditions of the two companies, the allowed trends in revenue requirement growth are quite similar. That is because the rapid output growth that results in the higher productivity target for Enbridge and thereby raises its X also results in a more rapid output growth adjustment.

 $^{^{35}}$ Volume trends would have to be weather normalized in an actual application, as they are in these computations.



INTERROGATORY

Ref: PEG Report, page 46

Issue Number: Issue:

- a) Please show the sensitivity of the econometric approach by removing the first year of data and re-estimating the parameters.
- b) Please show the sensitivity of the econometric approach by removing the last year of data and re-estimating the parameters.

RESPONSE

- a) Attached please find LMPA Q_25 Attachment.xls. The first worksheet (95-04 models) presents these results. The last worksheet (94-04 models) presents the original results based on the years 1994-2004. These two worksheets show that the output elasticities and TFP projections with the two different time periods are broadly similar.
- b) The second worksheet (94-03 models) of the above file presents the results based on the years 1994-2003. These results also indicate that the elasticities and TFP projections from all three models are similar.

Based on these findings, we conclude that the model results used in the June report are robust with regard to the changes in sample period.

TFP GROWTH PROJECTIONS FROM ECONOMETRIC RESEARCH Model Years: 1995-2004

	Geometric Decay Capital Costing		COS Capital Costing	
	Enbridge	Union	Enbridge	Union
Sample Years	2000-2005	2000-2005	2000-2005	2000-2005
Elasticity Estimates				
Customers [A]	0.661	0.643	0.706	0.689
Residential & Commercial Deliveries [B]	0.003	0.087	0.000	0.035
Other Deliveries [C]	0.068	0.121	0.068	0.138
Weights				
Customers [D]	90.30%	75.56%	91.21%	79.93%
Residential & Commercial Deliveries [E]	0.41%	10.22%	0.00%	4.06%
Other Deliveries [F]	9.29%	14.22%	8.79%	16.01%
Subindex Growth				
Customer [G]	3.27%	2.11%	3.27%	2.11%
Residential & Commercial Delivery [H]	1.58%	0.63%	1.58%	0.63%
Other Delivery [I]	-2.46%	1.33%	-2.46%	1.33%
Sum of Output Elasticities [J=A+B+C]	0.732	0.851	0.774	0.862
Output Growth (elasticity weighted) [K=D*G+E*H+F*I]	2.73%	1.85%	2.77%	1.93%
Technological Change [L]	1.06%	1.06%	1.33%	1.33%
Returns to Scale [M=(1-J)*K]	0.73%	0.28%	0.63%	0.27%
TFP Projection [L + M]	1.79%	1.33%	1.95%	1.59%

TFP GROWTH PROJECTIONS FROM ECONOMETRIC RESEARCH Model Years: 1994-2003

	Geometric Decay Capital Costing		COS Capital Costing	
	Enbridge	Union	Enbridge	Union
Sample Years	2000-2005	2000-2005	2000-2005	2000-2005
Elasticity Estimates				
Customers [A]	0.701	0.664	0.729	0.692
Residential & Commercial Deliveries [B]	0.000	0.047	0.000	0.007
Other Deliveries [C]	0.066	0.117	0.066	0.123
Weights				
Customers [D]	91.40%	80.19%	91.70%	84.18%
Residential & Commercial Deliveries [E]	0.00%	5.68%	0.00%	0.85%
Other Deliveries [F]	8.60%	14.13%	8.30%	14.96%
Subindex Growth				
Customer [G]	3.27%	2.11%	3.27%	2.11%
Residential & Commercial Delivery [H]	1.58%	0.63%	1.58%	0.63%
Other Delivery [I]	-2.46%	1.33%	-2.46%	1.33%
Sum of Output Elasticities [J=A+B+C]	0.767	0.828	0.795	0.822
Output Growth (elasticity weighted) [K=D*G+E*H+F*I]	2.78%	1.92%	2.79%	1.98%
Technological Change [L]	1.28%	1.28%	1.41%	1.41%
Returns to Scale [M=(1-J)*K]	0.65%	0.33%	0.57%	0.35%
TFP Projection [L + M]	1.92%	1.61%	1.98%	1.76%

TFP GROWTH PROJECTIONS FROM ECONOMETRIC RESEARCH Model Years: 1994-2004

	Geometric Decay Capital Costing		COS Capital Costing	
	Enbridge	Union	Enbridge	Union
Sample Years	2000-2005	2000-2005	2000-2005	2000-2005
Elasticity Estimates				
Customers [A]	0.657	0.638	0.713	0.692
Residential & Commercial Deliveries [B]	0.016	0.104	0.000	0.049
Other Deliveries [C]	0.063	0.109	0.059	0.113
Weights				
Customers [D]	89.27%	74.97%	92.36%	81.03%
Residential & Commercial Deliveries [E]	2.17%	12.22%	0.00%	5.74%
Other Deliveries [F]	8.56%	12.81%	7.64%	13.23%
Subindex Growth				
Customer [G]	3.27%	2.11%	3.27%	2.11%
Residential & Commercial Delivery [H]	1.58%	0.63%	1.58%	0.63%
Other Delivery [I]	-2.46%	1.33%	-2.46%	1.33%
Sum of Output Elasticities [J=A+B+C]	0.736	0.851	0.772	0.854
Output Growth (elasticity weighted) [K=D*G+E*H+F*I]	2.74%	1.83%	2.83%	1.92%
Technological Change [L]	1.19%	1.19%	1.45%	1.45%
Returns to Scale [M=(1-J)*K]	0.72%	0.27%	0.65%	0.28%
TFP Projection [L + M]	1.91%	1.46%	2.10%	1.73%

INTERROGATORY

Ref: PEG Report, page 57

Issue Number: Issue:

Please explain the statement that PEG sought a period ending in 2005 in which the start year had a similar real rate of return on the premise that a notable change in the real rate of return is not likely during the IR plan. Please refer to the numbers in Table 12 for this explanation as to why the 1999-2005 period was chosen.

<u>RESPONSE</u>

We have seen no evidence to suggest that a weighted average of long bond yields and returns on equity will rise or fall materially during the IR plan. Yet this average (see Table 12 column C) fell substantially during the early years of the 1988-2005 period. This was due chiefly to a decline in bond yields that substantially abated by 1998. Care must be taken to avoid an interval for the IPD that is unrepresentative of future conditions.

INTERROGATORY

Ref: PEG Report, page 57

Issue Number: 3.1 Issue: How should the X factor be determined?

- a) Please explain why PEG used 1998 as the start date for the COS capital service price indexes.
- b) Table 12 shows that the weighted average cost of capital was 6.1% in 2005, 5.8% in 1998 and 6.4% in 1997. Please explain why 1998 was used and not 1997 as the start date.
- c) Please update Tables 15a and 15b using 1997 2005 as the average. What is the impact on the change in the resulting price cap index estimations of using this period as the average?

RESPONSE

- a) This year had the weighted average cost of capital that was similar to that in 2005.
- b) We felt that, if anything, the weighted average cost of capital might rise a little over the IR period.
- c) Please see the tables 15a and 15b provided in response to question 19. It can be seen that the alternative period for IPD calculations results in considerably lower input price trends and modestly higher IPDs. If we average the results for the two candidate periods we obtain IPDs of 0.49% and 0.43% for Enbridge and Union respectively.

INTERROGATORY

Ref: PEG Report, page 64

Issue Number: 3.1 Issue: How should the X factor be determined?

Would it be reasonable for the Board to take an average of the GD and COS methodologies to calculate the price cap index results? If not, please explain why not.

RESPONSE

Yes.

INTERROGATORY

Ref: PEG Report, page 65

Issue Number: 4.2 Issue: How should the impact of changes in average use be calculated?

- a) Please explain why there is no double counting between the ADJ factor and the AU factor.
- b) Please explain why the recommendation is for a separate PCI's for rate classes that contain residential customers and all other rate classes? Why has a calculation for each individual rate class not been done based on their specific change in average use?
- c) Union Gas has received Board approval to split the existing M2 rate class into a new M2 rate class and a new M1 rate class. M1 customers would be all the existing M2 customers that use less than 50,000 m3 per year (the same as Rate 1 for Union North). The new M2 class would consist of the remaining existing M2 customers. Please confirm that the PEG report would indicate that the ADJ factor calculated for M2 would only apply to the new M1 rate class and that the new M2 rate class would be part of the nonresidential class of customers for Union.

RESPONSE

- a) The AU factor is designed to produce the X factor that is appropriate for a summary price cap index. The ADJ factor is designed to effect adjustments to this X factor that reflect differences in the way that the output trends of individual service classes affect cost and output when compared to output growth as a whole.
- b) We expect a large difference between the PCIs for residential customers and for all other customers taken as a whole. Hence, it is imperative to treat classes with residential customers separately. We set a common X factor for

other classes in the name of simplicity. Price cap plans do not normally have separate price caps for numerous service groups.

c) Yes. Please see our response to Union question 6.

INTERROGATORY

Ref: PEG Report, page 65

Issue Number: 4.2 Issue: How should the impact of changes in average use be calculated?

- a) Given the wide variation from year to year in the volume per customer, does PEG believe that this adjustment factor should be fixed for the entire term of the IR plan?
- b) Would it be more appropriate to reflect the change in the volume per customer through some process such as using a five year average of the most recent information available? If not, why not?
- c) What would be involved in updating the information each year during the term of an IR plan to reflect the most recent 5 years of information available? Please provide all the calculations, data requirements, etc. that would have to be updated if the Board were to approve an AU and/or ADJ factors that were updated on annual basis.

<u>RESPONSE</u>

- a) We believe that the proposed approach is reasonable considering that alternative approaches would weaken Union's incentives for effective marketing of its services.
- b) A five year average would weaken Union's marketing incentives.
- c) The calculations are straightforward. They are the same calculations detailed in the working papers attached to PEG's response to EGD question 2. They involve the gathering of detailed information on Union's billing determinants and the corresponding revenues.

INTERROGATORY

Ref: PEG Report, page 12

Issue Number: 2.1.1 Issue: Which macroeconomic or industry specific index should be used?

The evidence indicates that the GDPIPI for final domestic demand excludes prices of exports.

- a) Does the GDPIPI for final domestic demand also exclude the prices of imports?
- b) Please confirm that the definition used by Statistics Canada for final domestic demand is as follows:

"The sum of personal expenditure on consumer goods and services, net government current expenditure on goods and services, government gross fixed capital formation and business gross fixed capital formation."

c) Are there components of the final domestic demand GDPIPI such as business gross fixed capital formation in non-residential structures and equipment that may be relevant as price index to use for some component of a utility's price cap? Please explain.

RESPONSE

- a) Yes. Final domestic demand, which is a subset of GDP, excludes *net* exports, which is defined as exports minus imports.
- b) Correct.
- c) GDP-IPI is a measure of the economy's output and therefore grows considerably more slowly than the prices of inputs due to productivity growth. However, we have nonetheless found that in the United States the GDP-IPI is a good and publicly available measure of the trend in the prices of the

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miscellaneous materials and services purchased by utilities. With regard to the possible use of a price index for business gross fixed capital formation, we use instead the more specific Stats Canada deflator for the stock of gas distribution capital.

INTERROGATORY

Ref: PEG Report, page 16

Issue Number: 2.1 Issue: What type of index should be used as the inflation factor (industry specific index or macroeconomic index)?

The evidence indicates that the majority of rate indexing plans approved worldwide do not feature industry-specific inflation measures, but rather feature measures of economy-wide output price inflation such as GDPIPIs.

- a) Are consumer price indexes such as the CPI more commonly used than GDPIPIs as an economy-wide measure of inflation?
- b) Does Statistics Canada compute an industry specific inflation measure for gas utilities or utilities in general? If yes, please provide this index(es) for 1990 through to the most recent information available.

RESPONSE

- a) Measures like the GDP-IPI are used predominantly in North America whereas CPIs are used predominantly overseas.
- b) No.

INTERROGATORY

Ref: PEG Report, page 16

Issue Number: 2.3 Issue: How often should the Board update the inflation factor?

a) Do the majority of rate indexing plans approved worldwide update the inflation factor on an annual basis? If not, what is the range of alternatives currently used?

RESPONSE

Yes.