PCI Research for Ontario's Gas Utilities

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Introduction

PEG has completed its preliminary indexing research to design price cap indexes ("PCIs") for Ontario's gas utilities.

This presentation presents details of the research

Just and reasonable straw man results are emphasized

Just and reasonable on the basis of current research

Special circumstances necessitated methodological innovations

Suggestions for improving/simplifying the methods are welcomed

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Plan of Presentation

What to Expect?
Index Theory Reprised
Input Price Differential
Productivity Differential
Average Use Factor
Stretch Factor
Summary of Results
ADJ Factor
Rate Trends

Incentive Plan Design for Ontario's Gas Utilities

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Index Theory Reprised

Research has been guided by well-established index logic

If a *price* cap index is calibrated to track industry unit cost trend

trend PCI = trend Unit Cost - Stretch

$$= \text{trend Input Prices} - (\text{trend TFP}_R + \text{Stretch})$$

where

$$\text{TFP}_R = \text{trend Outputs}_R - \text{trend Inputs}$$
$$= \text{TFP Index w/}\textit{revenue}\text{-weighted output index}$$

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If, *additionally*, we wish to isolate the impact of average use on rates

trend PCI = trend Input Prices − (trend TFP_E + AU+ Stretch)

where

TFP_E = trend $Outputs_E$ − trend Inputs
= TFP Index w/*elasticity*-weighted output index

AU = Average use factor
= trend $Output^R$ − $Output^E$

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If, *additionally*, a GDPIPI is the PCI inflation measure,

trend PCI
= trend GDPIPI - [trend TFP_R + AU +
$\qquad\qquad$ (trend Input Prices – trend GDPIPI) + Stretch]

= trend GDPIPI - (PD + IPD + AU + Stretch)

where

PD = Productivity Differential = TFP_E^{Gas} – TFP^{Canada}
IPD = Input Price Differential = Input Prices^{Canada} - Input Prices^{Gas}

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If, *additionally*, we want price caps for individual service groups, the PCI for service class g is

trend PCI_g = trend GDPIPI - (PD + AU + IPD + Stretch + ADJ_g)

>>> X factor has five terms (#!&?)

>>> Complexity of straw man PCIs reflects the special demands
        placed upon the indexing exercise

    e.g. Formula for a *revenue* cap index would be much simpler

trend RCI_g =
        trend GDPIPI - (PD + IPD + trend $Output_E$ + Stretch)

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Input Price Differential

IPD research revealed importance of capital cost measurement

PEG customarily uses an approach that features

- Replacement valuation of plant
- Geometric decay (constant rate of depreciation)

Resultant industry input price index highly unstable due to

- Surge in gas utility construction costs
- Decline in rate of return

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Capital Price Indexes

Here is the formula for replacement valuation & geometric decay

$$Price^{Capital} = d * WKA_{t-1} + r_t * WKA_{t-1} - (WKA_t - WKA_{t-1})$$

$WKA_t =$ construction cost index
$r_t =$ cost of funds
$d =$ (constant) depreciation rate

Capital cost drivers include   Construction Cost
Cost of funds

Inherently volatile, need smoothing

Input Price Differential

Instability of results prompted use of a more novel cost of service ("COS") approach

- Book valuation of plant
- Straight line depreciation

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$$ck_t = xk_t \cdot \sum_{s=0}^{N-1} \left(\frac{xk_{t-1}^{t-s}}{xk_t} \cdot WKA_{t-s} \right) \cdot I_t + xk_t \cdot \sum_{s=0}^{N-1} \frac{xk_t^{t-s}}{xk_{t-1}} \cdot WKA_{t-s} \cdot \frac{1}{N-s} \qquad [A11]$$

$$= xk_t \cdot WKS_t.$$

Here,

$$WKS_t = \sum_{s=0}^{N-1} \frac{xk_{t-1}^{t-s}}{xk_t} \cdot WKA_{t-s} \cdot I_t + \sum_{s=0}^{N-1} \frac{xk_t^{t-s}}{xk_t} \cdot WKA_{t-s} \cdot \frac{1}{N-s}.$$

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Table 12

Capital Service Price Index: Geometric Decay Capital Cost[0]

Year	Rate of Return						Construction Cost Index			Real Rate of Return				Depreciation Rate[7]	Capital Service Price Indexes			
	Corporate Long Term Bond Yield		Return on Equity[3]		Weighted Average Cost of Capital				Capital Gain (Smoothed)	Unsmoothed		Smoothed			Unsmoothed		Real Rate Smoothed	
	Level[1]	Growth Rate[2]	All companies	Utilities	Level[4]	Growth Rate[2]	Level[5]	Growth Rate[2] $[E]=\frac{D_t-D_{(t-1)}}{D_{(t-1)}}$	$[F]$=3 Year Moving Average of $[E]$	Level	Growth Rate[2]	Level $[H]$=3 Year Moving Average of $[G]$	Growth Rate[2]		Level	Growth Rate[2]	Level	Growth Rate[2]
	$[A]$	(%)		$[B]$	$[C]=(.65*A+.35*B)$	(%)	$[D]$			$[G]=C-E$	(%)		(%)	$[I]$	$[J]=G*D_{(t-1)}+I*D_t$	(%)	$[K]=D_{(t-1)}*H+I*D_t$	(%)
1988	10.9%		12.7%	6.4%	9.4%		9.5	6.7%	3.6%	2.7%				3.7%	0.58			
1989	10.8%	-1.1	11.5%	5.5%	8.9%	-4.6	9.8	3.8%	3.2%	5.2%	64.7			3.7%	0.85	38.8		
1990	11.9%	9.7	7.6%	4.2%	9.2%	2.9	10.1	2.5%	4.3%	6.7%	26.6	4.9%		3.7%	1.04	19.4	0.85	
1991	10.8%	-9.7	3.9%	3.5%	8.3%	-10.9	10.0	-0.3%	2.0%	8.5%	23.6	6.8%	33.6	3.7%	1.23	17.3	1.06	21.7
1992	9.9%	-8.8	1.7%	6.0%	8.5%	3.1	10.3	3.1%	1.8%	5.4%	-45.6	6.9%	1.2	3.7%	0.93	-28.4	1.08	1.7
1993	8.8%	-11.2	3.8%	6.2%	7.9%	-7.0	10.7	3.1%	2.0%	4.8%	-12.0	6.2%	-9.9	3.7%	0.89	-3.8	1.04	-3.2
1994	9.4%	6.5	6.7%	5.9%	8.2%	3.3	11.6	8.4%	4.9%	-0.2%	NA	3.3%	-63.1	3.7%	0.40	-79.3	0.78	-28.6
1995	9.0%	-4.6	9.8%	5.5%	7.8%	-5.1	12.3	6.7%	6.1%	1.1%	NA	1.9%	-56.0	3.7%	0.59	37.8	0.68	-14.6
1996	8.1%	-10.6	10.3%	6.2%	7.4%	-4.7	12.3	0.0%	5.0%	7.4%	187.6	2.8%	37.9	3.7%	1.37	84.6	0.80	16.6
1997	7.0%	-15.4	10.9%	5.4%	6.4%	-14.7	12.7	3.0%	3.2%	3.4%	-77.4	4.0%	36.5	3.7%	0.89	-43.0	0.96	18.7
1998	6.2%	-11.1	8.8%	5.0%	5.8%	-10.2	13.1	3.4%	2.1%	2.4%	-34.0	4.4%	10.3	3.7%	0.80	-11.5	1.05	8.5
1999	6.6%	6.5	9.9%	8.9%	7.4%	24.6	13.8	5.0%	3.8%	2.5%	0.9	2.8%	-46.9	3.7%	0.83	4.6	0.88	-18.2
2000	7.1%	7.1	10.9%	7.3%	7.2%	-3.2	14.4	4.1%	4.1%	3.1%	24.0	2.7%	-3.7	3.7%	0.96	14.4	0.90	2.8
2001	7.1%	-0.5	7.4%	10.2%	8.2%	12.9	14.3	-0.7%	2.8%	8.8%	104.2	4.8%	58.8	3.7%	1.80	62.5	1.22	30.3
2002	7.0%	-1.6	5.7%	6.4%	6.8%	-18.8	14.2	-0.3%	1.0%	7.1%	-22.5	6.3%	27.7	3.7%	1.54	-15.9	1.43	16.1
2003	6.5%	-7.1	9.6%	7.4%	6.8%	0.5	14.4	1.3%	0.1%	5.6%	-23.9	7.2%	12.1	3.7%	1.33	-14.7	1.55	8.0
2004	6.1%	-7.0	11.4%	8.4%	6.9%	0.7	15.8	9.7%	3.5%	-2.8%	NA	3.3%	-78.1	3.7%	0.18	-197.8	1.06	-38.3
2005	5.4%	-12.3	11.4%	7.4%	6.1%	-12.2	17.6	11.4%	7.4%	-5.3%	NA	-0.9%	NA	3.7%	-0.19	NA	0.52	-71.4
2006	5.4%	0.6	11.2%	5.7%	5.5%	-9.9	*17.6* [7]	0.1%	7.1%	5.4%	NA	-0.9%	NA	3.7%	1.62	NA	0.51	-1.9
Average Annual Growth Rate (%)																		
1991-2005		-5.00	7.76	5.28		-2.19		4.01	3.43		NA		NA	0.00		NA		-5.09
1993-2002		**-2.64**	**4.46**	**0.31**		**-1.74**		**3.20**	**3.68**		**4.30**		**0.17**	**0.00**		**6.03**		**3.54**
1994-2004		**-4.43**	**5.32**	**3.46**		**-1.78**		**3.11**	**3.19**		**NA**		**-0.13**	**0.00**		**-7.89**		**3.00**
2000-2005		-5.69	0.90	0.21		-3.39		4.06	2.98		NA		NA	0.00		NA		-11.06

[0]Assumes replacement valuation of assets and a constant rate of depreciation.

[1]Source: Statistics Canada, average bond yields on Canadian corporate bonds.

[2]All growth rates are logarithmic except the Construction Cost Index.

[3]Source: Statistics Canada, Quarterly Statement of Changes in Financial Position, by North American Industry Classification System (NAICS), selected financial ratios.

[4]Calculation of weighted average cost of capital is 65% corporate long term bond, 35% ROE for utilities. Weights reflect Ontario gas utility norms.

[5]Source: Statistics Canada, Electric Distribution Utility Construction Cost Index. This was adjusted for differences in the growth rates of the Handy Whitman indexes of gas and electric utility construction costs.

[6]This number is computed using the Electric Utility Construction Cost Index, but was only adjusted for the differences in the growth rates of the Handy Whitman indexes for January 2006.

[7]Assumes depreciation based on the 46 year service life for Union Gas.

FIGURE 2: CALCULATION OF UNSMOOTHED GEOMETRIC DECAY CAPITAL SERVICE PRICE INDEX

Legend: ROR ···· | Construction Cost Index – – – | Real ROR ■ | Unsmoothed capital service price ——

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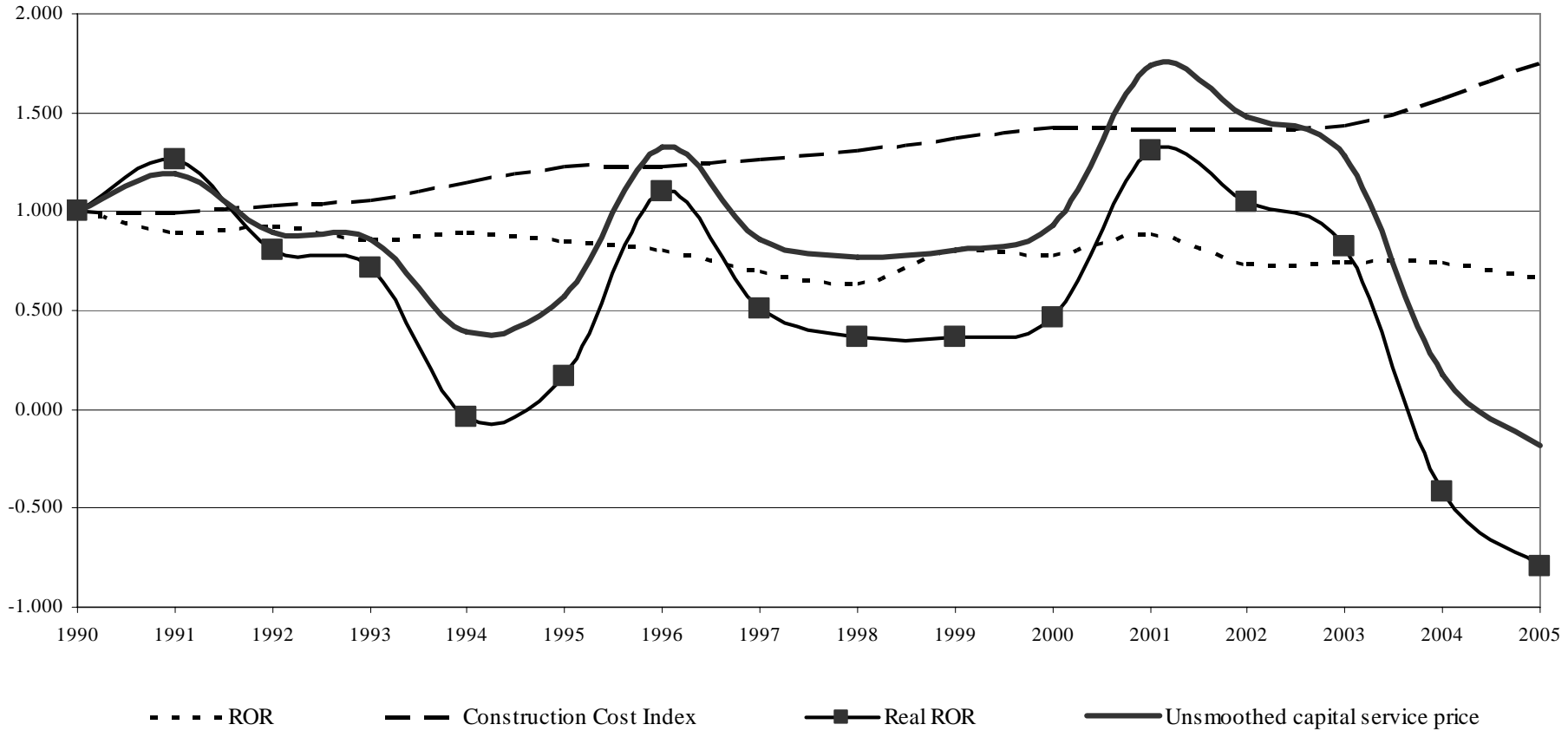
FIGURE 3: COMPARISONS OF ALTERNATIVE CAPITAL SERVICE PRICE INDEXES

Unsmoothed capital service price — — Smoothed capital service price — ■ — COS capital service price for Enbridge

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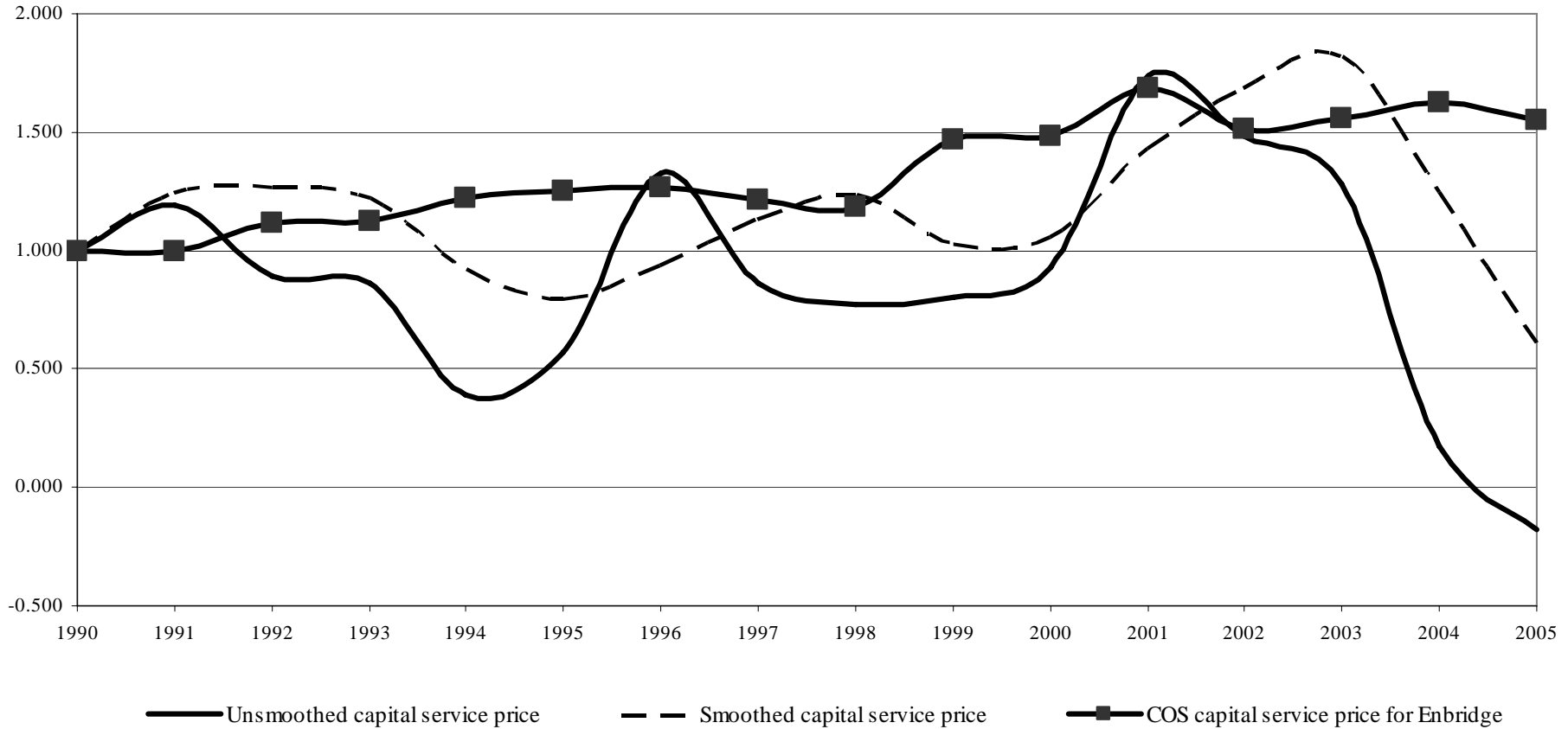ECONOMIC AND LITIGATION CONSULTING

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

Year	Capital (Unsmoothed)			Capital (Real Rate Smoothed)			Labour			Cost of Natural Gas			Materials and Services			IPI - Enbridge Unsmoothed		Smoothed	
	Index[1]	Growth Rate	Weight[o]	Index[1]	Growth Rate	Weight[o]	Index[2]	Growth Rate	Weight[o]	Index[3]	Growth Rate	Weight[o]	Index[4]	Growth Rate	Weight[o]	Level	Growth Rate	Level	Growth Rate
		(%)	(%)		(%)	(%)		(%)	(%)		(%)	(%)		(%)	(%)		(%)		(%)
1988	0.58						80.1			100.2			82.2			1.00			
1989	0.85	39	70.8			70.8	85.1	6.1	9.4	95.6	-4.7	0.0	86.4	5.0	19.9	1.34	29.0		
1990	1.04	19	70.8	0.85		70.8	90.3	5.9	9.4	96.5	0.9	0.0	89.2	3.2	19.9	1.55	14.9		
1991	1.23	17	70.8	1.06	22	70.8	96.5	6.6	9.4	98.2	1.7	0.0	93.0	4.2	19.9	1.78	13.7	1.00	
1992	0.93	-28	70.8	1.08	2	70.8	100	3.6	9.4	98.4	0.2	0.0	93.2	0.2	19.9	1.46	-19.7	1.02	1.6
1993	0.89	-4	70.8	1.04	-3	70.8	102.6	2.6	9.4	104.5	6.0	0.0	94.6	1.5	19.9	1.43	-2.1	1.00	-1.7
1994	0.40	-79	70.8	0.78	-28	70.8	105.7	3.0	9.4	114.8	9.4	0.0	94.7	0.1	19.9	0.82	-55.8	0.82	-19.9
1995	0.59	38	70.8	0.68	-15	70.8	108.3	2.4	9.4	94.2	-19.8	0.0	96.8	2.2	19.9	1.08	27.4	0.74	-9.6
1996	1.37	85	70.8	0.80	17	70.8	109.5	1.1	9.4	94.6	0.4	0.0	98.4	1.6	19.9	1.97	60.3	0.84	12.2
1997	0.89	-43	70.8	0.96	19	70.8	111.5	1.8	9.4	100.0	5.6	0.0	100.0	1.6	19.9	1.46	-29.9	0.96	13.7
1998	0.80	-11	70.8	1.05	9	70.8	113.6	1.9	9.4	111.1	10.5	0.0	100.3	0.3	19.9	1.35	-7.9	1.03	6.3
1999	0.83	5	70.8	0.88	-18	70.8	115.4	1.6	9.4	125.7	12.3	0.0	101.0	0.7	19.9	1.40	3.5	0.90	-12.6
2000	0.96	14	70.8	0.90	3	70.8	117.9	2.1	9.4	167.6	28.8	0.0	102.7	1.7	19.9	1.55	10.7	0.93	2.5
2001	1.80	62	72.6	1.22	30	72.6	120.8	2.4	8.3	250.1	40.0	0.0	103.9	1.2	19.0	2.46	45.8	1.16	22.4
2002	1.54	-16	76.1	1.43	16	76.1	124.6	3.1	6.7	214.8	-15.2	0.0	106.1	2.1	17.2	2.19	-11.5	1.32	12.8
2003	1.33	-15	74.1	1.55	8	74.1	127.8	2.5	7.0	225.0	4.6	0.0	107.8	1.6	19.0	1.97	-10.4	1.41	6.4
2004	0.18	-198	66.9	1.06	-38	66.9	131.5	2.9	9.3	226.8	0.8	0.0	110.1	2.1	23.8	0.53	-131.5	1.10	-24.9
2005	-0.19	NA	53.6	0.52	-71	53.6	135.6	3.1	13.7	239.6	5.5	0.0	111.2	1.0	32.6	NA	NA	0.75	-37.5
2006	1.62	NA	53.6	0.51	-2	53.6	139.1	2.5	13.7	251.4	4.8	0.0	113.6 [5]	2.1	32.6	NA	NA	0.75	0.0

Average Annual Growth Rate (%)																			
1991-2005	NA			-3.55			2.90			6.50			1.57				NA		-2.02
1993-2002	**6.03**			**3.54**			**2.16**			**8.01**			**1.27**				**4.74**		**3.10**
1994-2004	**-0.08**			**3.00**			**2.18**			**6.81**			**1.51**				**-4.34**		**2.93**
2000-2005	NA			-11.06			2.80			7.14			1.59				NA		-4.15

[o] Source: Cost shares based on PEG research on Enbridge Gas Distribution.
[1] Source: PEG calculation. See Table 12 for details.
[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.
[5] The GDP-IPI number for Ontario has not yet been released. Therefore, we approximated this number by adjusting the 2005 Ontario GDP-IPI information with the growth rate for the Canadian GDP-IPI in the 2005-2006 period.

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Input Price Index: Geometric Decay Capital Cost for Union Gas

Year	Capital (Unsmoothed)			Capital (Real Rate Smoothed)			Labour			Cost of Natural Gas			Materials and Services			IPI - Union Unsmoothed		Smoothed	
	Index[1]	Growth Rate (%)	Weightº (%)	Index[1]	Growth Rate (%)	Weightº (%)	Index[2]	Growth Rate (%)	Weightº (%)	Index[3]	Growth Rate (%)	Weightº (%)	Index[4]	Growth Rate (%)	Weightº (%)	Level	Growth Rate (%)	Level	Growth Rate (%)
1988	0.58						80.1			100.2			82.2			1.00			
1989	0.85	39	65.5			65.5	85.1	6.1	19.3	95.6	-4.7	1.3	86.4	5.0	13.9	1.31	27.2		
1990	1.04	19	65.5	0.85		65.5	90.3	5.9	19.3	96.5	0.9	1.3	89.2	3.2	13.9	1.51	14.3		
1991	1.23	17	65.5	1.06	22	65.5	96.5	6.6	19.3	98.2	1.7	1.3	93.0	4.2	13.9	1.73	13.2	1.00	
1992	0.93	-28	65.5	1.08	2	65.5	100	3.6	19.3	98.4	0.2	1.3	93.2	0.2	13.9	1.45	-17.9	1.02	1.8
1993	0.89	-4	65.5	1.04	-3	65.5	102.6	2.6	19.3	104.5	6.0	1.3	94.6	1.5	13.9	1.42	-1.7	1.01	-1.3
1994	0.40	-79	65.5	0.78	-28	65.5	105.7	3.0	19.3	114.8	9.4	1.3	94.7	0.1	13.9	0.85	-51.2	0.84	-18.0
1995	0.59	38	65.5	0.68	-15	65.5	108.3	2.4	19.3	94.2	-19.8	1.3	96.8	2.2	13.9	1.10	25.3	0.77	-9.0
1996	1.37	85	65.5	0.80	17	65.5	109.5	1.1	19.3	94.6	0.4	1.3	98.4	1.6	13.9	1.92	55.9	0.86	11.4
1997	0.89	-43	65.5	0.96	19	65.5	111.5	1.8	19.3	100.0	5.6	1.3	100.0	1.6	13.9	1.46	-27.5	0.98	12.9
1998	0.80	-11	65.5	1.05	9	65.5	113.6	1.9	19.3	111.1	10.5	1.3	100.3	0.3	13.9	1.36	-7.0	1.04	6.1
1999	0.83	5	65.5	0.88	-18	65.5	115.4	1.6	19.3	125.7	12.3	1.3	101.0	0.7	13.9	1.41	3.6	0.93	-11.3
2000	0.96	14	66.0	0.90	3	66.0	117.9	2.1	18.6	167.6	28.8	2.5	102.7	1.7	12.9	1.57	10.8	0.96	3.2
2001	1.80	62	68.5	1.22	30	68.5	120.8	2.4	16.6	250.1	40.0	2.6	103.9	1.2	12.2	2.44	44.4	1.20	22.3
2002	1.54	-16	70.7	1.43	16	70.7	124.6	3.1	14.7	214.8	-15.2	2.0	106.1	2.1	12.6	2.19	-10.8	1.35	11.8
2003	1.33	-15	70.9	1.55	8	70.9	127.8	2.5	14.5	225.0	4.6	3.3	107.8	1.6	11.3	1.99	-9.7	1.44	6.4
2004	0.18	-198	63.0	1.06	-38	63.0	131.5	2.9	18.3	226.8	0.8	4.0	110.1	2.1	14.6	0.58	-123.8	1.14	-23.3
2005	-0.19	NA	51.8	0.52	-71	51.8	135.6	3.1	25.0	239.6	5.5	5.6	111.2	1.0	17.6	NA	NA	0.80	-35.7
2006	1.62	NA	51.8	0.51	-2	51.8	139.1	2.5	25.0	251.4	4.8	5.6	*113.6* [5]	2.1	17.6	NA	NA	0.80	0.28
Average Annual Growth Rate (%)																			
1991-2005	NA			-3.55			2.90			6.50			1.57			NA			-1.63
1993-2002	**6.03**			**3.54**			**2.16**			**8.01**			**1.27**			**4.83**			**3.26**
1994-2004	**-0.08**			**3.00**			**2.18**			**6.81**			**1.51**			**-3.88**			**3.04**
2000-2005	NA			-11.06			2.80			7.14			1.59			NA			-3.70

ºSource: Cost shares based on PEG research on Union Gas.

[1]Source: PEG calculation. See Table 12 for details.

[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.

[5] The GDP-IPI number for Ontario has not yet been released. Therefore, we approximated this number by adjusting the 2005 Ontario GDP-IPI information with the growth rate for the Canadian GDP-IPI in the 2005-2006 period.

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Table 14

Input Price Differentials: Geometric Decay Capital Cost

	Input Price Indexes									Input Price Differentials			
	Canadian Economy					Enbridge (Growth Rate)		Union (Growth Rate)		(Economy - Enbridge)		(Economy - Union)	
	GDP-IPI[1]		MFP[2]		Estimated	Not	Real Rate	Not	Real Rate	Not	Real Rate	Not	Real Rate
		Growth		Growth	Growth	Smoothed[4]	Smoothed[4]	Smoothed[5]	Smoothed[5]	Smoothed	Smoothed	Smoothed	Smoothed
	Level	Rate	Level	Rate	Rate								
		[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	29.0	NA	27.2	NA	-26.0	NA	-24.2	NA
1990	88.4	3.7	97.7	-2.2	1.5	14.9	NA	14.3	NA	-13.4	NA	-12.8	NA
1991	91.4	3.3	95.0	-2.8	0.5	13.7	NA	13.2	NA	-13.2	NA	-12.7	NA
1992	93.0	1.7	95.9	0.9	2.7	-19.7	1.6	-17.9	1.8	22.4	1.1	20.6	0.9
1993	94.9	2.0	96.3	0.4	2.4	-2.1	-1.7	-1.7	-1.3	4.6	4.1	4.1	3.7
1994	96.3	1.5	99.0	2.8	4.2	-55.8	-19.9	-51.2	-18.0	60.0	24.1	55.5	22.2
1995	97.4	1.1	99.5	0.5	1.6	27.4	-9.6	25.3	-9.0	-25.8	11.3	-23.7	10.7
1996	98.5	1.1	98.7	-0.8	0.3	60.3	12.2	55.9	11.4	-60.0	-11.9	-55.6	-11.0
1997	100.0	1.5	100.0	1.3	2.8	-29.9	13.7	-27.5	12.9	32.7	-10.9	30.3	-10.1
1998	101.3	1.3	101.1	1.1	2.4	-7.9	6.3	-7.0	6.1	10.3	-3.9	9.4	-3.7
1999	102.6	1.3	103.5	2.3	3.6	3.5	-12.6	3.6	-11.3	0.1	16.2	0.1	15.0
2000	105.0	2.3	106.1	2.5	4.8	10.7	2.5	10.8	3.2	-5.9	2.3	-6.0	1.6
2001	106.8	1.7	106.7	0.6	2.3	45.8	22.4	44.4	22.3	-43.5	-20.1	-42.1	-20.1
2002	109.3	2.3	108.9	2.0	4.4	-11.5	12.8	-10.8	11.8	15.9	-8.5	15.2	-7.4
2003	110.8	1.4	109.0	0.1	1.5	-10.4	6.4	-9.7	6.4	11.8	-5.0	11.2	-4.9
2004	112.7	1.7	109.5	0.5	2.2	-131.5	-24.9	-123.8	-23.3	133.7	27.0	126.0	25.5
2005	114.7	1.8	110.0 [3]	0.5	2.3	NA	-37.5	NA	-35.7	NA	39.8	NA	38.0
2006	116.8	1.8	110.0 [3]	0.5	2.3	NA	0.0	NA	0.3	NA	2.3	NA	2.0

Average Annual Growth Rate (%)

1991-2005		1.62		1.05	2.67	NA	-2.02	NA	-1.63	NA	4.69	NA	4.30
1993-2002		**1.57**		**1.37**	**2.94**	**4.74**	**3.10**	**4.83**	**3.26**	**-1.81**	**-0.16**	**-1.89**	**-0.33**
1994-2004		1.57		1.01	2.58	-4.34	2.93	-3.88	3.04	6.92	-0.35	6.46	-0.46
2000-2005		1.77		0.73	2.50	NA	-4.15	NA	-3.70	NA	6.65	NA	6.20

[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 rates for 2005 and 2006 were imputed using the 2004 MFP Growth Rate due to a lack of data.

[4] See Tables 12 and 13a for details of calculations

[5] Source: See Tables 12 and 13b for details of calculations.

Input Price Index with COS Capital Cost: Enbridge Gas Distribution

Year	Capital (COSR Method)			Labour			Natural Gas			Materials and Services			Input Price Index	
	Index[1]	Growth Rate (%)	Weight[o] (%)	Index[2]	Growth Rate (%)	Weight[o] (%)	Index[3]	Growth Rate (%)	Weight[o] (%)	Index[4]	Growth Rate (%)	Weight[o] (%)	Index	Growth Rate (%)
1990	0.643		71.8	90.3		9.0	96.5		0.0	89.2		19.2	1.000	
1991	0.639	-0.6	71.8	96.5	6.6	9.0	98.2	1.7	0.0	93.0	4.2	19.2	1.009	0.9
1992	0.714	11.2	71.8	100	3.6	9.0	98.4	0.2	0.0	93.2	0.2	19.2	1.098	8.4
1993	0.721	0.9	71.8	102.6	2.6	9.0	104.5	6.0	0.0	94.6	1.5	19.2	1.111	1.1
1994	0.784	8.5	71.8	105.7	3.0	9.0	114.8	9.4	0.0	94.7	0.1	19.2	1.184	6.4
1995	0.802	2.2	71.8	108.3	2.4	9.0	94.2	-19.8	0.0	96.8	2.2	19.2	1.210	2.2
1996	0.815	1.6	71.8	109.5	1.1	9.0	94.6	0.4	0.0	98.4	1.6	19.2	1.230	1.6
1997	0.778	-4.7	71.8	111.5	1.8	9.0	100.0	5.6	0.0	100.0	1.6	19.2	1.195	-2.9
1998	0.763	-2.0	71.8	113.6	1.9	9.0	111.1	10.5	0.0	100.3	0.3	19.2	1.181	-1.2
1999	0.947	21.6	71.8	115.4	1.6	9.0	125.7	12.3	0.0	101.0	0.7	19.2	1.383	15.8
2000	0.960	1.4	71.8	117.9	2.1	9.0	167.6	28.8	0.0	102.7	1.7	19.2	1.403	1.5
2001	1.089	12.6	70.5	120.8	2.4	9.0	250.1	40.0	0.0	103.9	1.2	20.5	1.542	9.4
2002	0.977	-10.8	71.3	124.6	3.1	8.1	214.8	-15.2	0.0	106.1	2.1	20.6	1.438	-7.0
2003	1.004	2.7	67.5	127.8	2.5	8.7	225.0	4.6	0.0	107.8	1.6	23.7	1.473	2.4
2004	1.045	4.0	66.4	131.5	2.9	9.4	226.8	0.8	0.0	110.1	2.1	24.2	1.525	3.5
2005	0.996	-4.8	65.9	135.6	3.1	10.1	239.6	5.5	0.0	111.2	1.0	24.0	1.485	-2.7

Average Annual Growth Rates (%)

Year														
1990-2005	2.92			2.71			6.06			1.47			2.64	
1997-2003	**4.24**			**2.27**			**13.52**			**1.25**			**3.49**	
1998-2005	**3.80**			**2.53**			**10.98**			**1.47**			**3.28**	
2000-2005	0.73			2.80			7.14			1.59			1.14	

[o] Weights based on research for Enbridge Gas Distribution.
[1] PEG calculation using Enbridge plant data.
[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.

Input Price Index with COS Capital Cost: Union Gas

Year	Capital (COSR Method)			Labour			Natural Gas			Materials and Services			Input Price Index	
	Index[1]	Growth Rate (%)	Weight[o] (%)	Index[2]	Growth Rate (%)	Weight[o] (%)	Index[3]	Growth Rate (%)	Weight[o] (%)	Index[4]	Growth Rate (%)	Weight[o] (%)	Index	Growth Rate (%)
1990	0.636		62.5	90.3		21.0	96.5		1.4	89.2		15.1	1.000	
1991	0.646	1.5	62.5	96.5	6.6	21.0	98.2	1.7	1.4	93.0	4.2	15.1	1.030	2.963
1992	0.710	9.5	62.5	100	3.6	21.0	98.4	0.2	1.4	93.2	0.2	15.1	1.102	6.710
1993	0.715	0.8	62.5	102.6	2.6	21.0	104.5	6.0	1.4	94.6	1.5	15.1	1.116	1.329
1994	0.777	8.3	62.5	105.7	3.0	21.0	114.8	9.4	1.4	94.7	0.1	15.1	1.185	5.946
1995	0.815	4.8	62.5	108.3	2.4	21.0	94.2	-19.8	1.4	96.8	2.2	15.1	1.228	3.555
1996	0.818	0.4	62.5	109.5	1.1	21.0	94.6	0.4	1.4	98.4	1.6	15.1	1.236	0.713
1997	0.773	-5.7	62.5	111.5	1.8	21.0	100.0	5.6	1.4	100.0	1.6	15.1	1.202	-2.851
1998	0.753	-2.5	62.5	113.6	1.9	21.0	111.1	10.5	1.4	100.3	0.3	15.1	1.190	-1.007
1999	0.926	20.6	62.5	115.4	1.6	21.0	125.7	12.3	1.4	101.0	0.7	15.1	1.361	13.494
2000	0.940	1.5	64.3	117.9	2.1	19.5	167.6	28.8	2.6	102.7	1.7	13.6	1.391	2.175
2001	1.067	12.7	63.6	120.8	2.4	19.2	250.1	40.0	3.0	103.9	1.2	14.1	1.536	9.871
2002	0.961	-10.5	65.4	124.6	3.1	17.4	214.8	-15.2	2.4	106.1	2.1	14.8	1.442	-6.307
2003	0.985	2.5	61.7	127.8	2.5	19.0	225.0	4.6	4.4	107.8	1.6	14.9	1.477	2.427
2004	1.022	3.7	59.5	131.5	2.9	20.1	226.8	0.8	4.4	110.1	2.1	16.0	1.525	3.169
2005	0.970	-5.2	59.5	135.6	3.1	21.0	239.6	5.5	4.7	111.2	1.0	14.8	1.494	-2.062

Average Annual Growth Rates (%)

1990-2005	2.81			2.71			6.06			1.47			2.68	
1997-2003	**4.04**			**2.27**			**13.52**			**1.25**			**3.44**	
1998-2005	**3.61**			**2.53**			**10.98**			**1.47**			**3.25**	
2000-2005	0.64			2.80			7.14			1.59			1.42	

[0]Weights based on research for Union Gas

[1] PEG calculation using Union plant data.

[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

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Input Price Differentials with COS Capital Cost

	Ontario Economy					Ontario Gas Industry		Input Price Differential	
	GDP-IPI[1]		MFP[2]		Implied IPI				
	Level	Growth Rate [A] (%)	Level	Growth Rate [B] (%)	Growth Rate [C]=A+B (%)	Enbridge[4] [D] (%)	Union[5] [E] (%)	Enbridge [C]-[D] (%)	Union [C]-[E] (%)
1990	89.2		97.7						
1991	92.3	3.4	95.0	-2.8	0.6	0.9	3.0	-0.3	-2.3
1992	93.4	1.2	95.9	0.9	2.1	8.4	6.7	-6.3	-4.6
1993	95.3	2.0	96.3	0.4	2.4	1.1	1.3	1.3	1.1
1994	96.4	1.1	99.0	2.8	3.9	6.4	5.9	-2.5	-2.0
1995	97.6	1.2	99.5	0.5	1.7	2.2	3.6	-0.5	-1.8
1996	98.6	1.0	98.7	-0.8	0.2	1.6	0.7	-1.4	-0.5
1997	100.0	1.4	100.0	1.3	2.7	-2.9	-2.9	5.6	5.6
1998	101.5	1.5	101.1	1.1	2.6	-1.2	-1.0	3.8	3.6
1999	102.6	1.1	103.5	2.3	3.4	15.8	13.5	-12.3	-10.1
2000	105.1	2.4	106.1	2.5	4.9	1.5	2.2	3.4	2.7
2001	106.9	1.7	106.7	0.6	2.3	9.4	9.9	-7.2	-7.6
2002	109.2	2.1	108.9	2.0	4.2	-7.0	-6.3	11.2	10.5
2003	110.7	1.4	109.0	0.1	1.5	2.4	2.4	-1.0	-1.0
2004	112.5	1.6	109.5	0.5	2.1	3.5	3.2	-1.4	-1.1
2005	114.3	1.6	*110.0* [3]	*0.5*	2.0	-2.7	-2.1	4.7	4.1
Average Annual Growth Rates (%)									
1990-2005		1.65		0.79	2.44	2.64	2.68	-0.19	-0.23
1997-2003		1.69		1.44	3.13	3.49	3.44	-0.36	-0.31
1998-2005		**1.70**		**1.21**	**2.90**	**3.28**	**3.25**	**-0.37**	**-0.35**
2000-2005		1.68		0.72	2.40	1.14	1.42	1.27	0.98

[1] Source: Statistics Canada, GDP-IPI, Final Domestic Demand, for Ontario

[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.

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

Ince

IPD Conclusions

Using either capital costing method, gas utility input prices have grown much more rapidly than GDPIPI

COS approach to capital costing has promise

COS Advantages   Stable input price trends
                        More relevant to ratemaking
                        Demystifies IPD calculations
                        Less rocket science in index calculations

COS Disadvantages   Formulas more messy
                        GD treatment would simplify calculations

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Productivity Differential

PD = trend $TFP_E^{Utility}$ - trend TFP^{Canada}

$TFP_E^{Utility}$ ideally based on *external* data

Indexes calculated for Enbridge, Union, & U.S. sample

Two ways to use U.S. data to create TFP growth target

- Peer group
- Econometric Projection

Table 1

SAMPLED U.S. GAS DISTRIBUTORS FOR TFP RESEARCH

Region	Company	Number of Customers (2004)	Percent Sample Total	Percent Continental US
Northeast				
	Baltimore Gas & Electric	624,862		
	Central Hudson Gas & Electric	69,081		
	Connecticut Natural Gas	151,127		
	Consolidated Edison of New York	1,041,458		
	Niagara Mohawk	560,566		
	New Jersey Natural Gas	453,983		
	Nstar Gas	252,576		
	Orange and Rockland Utilities	123,577		
	PECO Energy	464,619		
	People's Natural Gas (PA)	355,134		
	PG Energy	159,242		
	Public Service Electric & Gas	1,693,048		
	Rochester Gas and Electric	293,334		
	Southern Connecticut Gas	170,817		
	Total	*6,413,424*	*20.5%*	
	EIA Regional Total	*14,210,646*		*20.7%*
Southeast				
	Atlanta Gas Light	1,532,615		
	Public Service of North Carolina	390,824		
	Washington Gas Light	980,686		
	Total	*2,904,125*	*9.3%*	
	EIA Regional Total	*6,554,338*		*9.5%*
Midwest and Plains				
	Consumers Energy	1,690,874		
	East Ohio Gas	1,217,546		
	Illinois Power	414,015		
	Madison Gas and Electric	131,674		
	North Shore Gas	153,856		
	NICOR Gas	2,092,607		
	Peoples Gas Light & Coke	812,705		
	Wisconsin Gas	570,927		
	Wisconsin Power & Light	169,216		
	Total	*7,253,420*	*23.2%*	
	EIA Regional Total	*20,348,354*		*29.6%*
South Central				
	Alabama Gas	460,921		
	Louisville Gas and Electric	316,311		
	Total	*777,232*	*2.5%*	
	EIA Regional Total	*10,240,944*		*14.9%*
Southwest				
	Southwest Gas	1,526,462		
	Questar	777,555		
	Total	*2,304,017*	*7.4%*	
	EIA Regional Total	*4,679,222*		*6.8%*
Northwest				
	Cascade Natural Gas	217,336		
	Northwest Natural Gas	586,461		
	Puget Sound Energy	661,739		
	Total	*1,465,536*	*4.7%*	
	EIA Regional Total	*2,282,626*		*3.3%*
California				
	Pacific Gas & Electric	4,030,373		
	San Diego Gas & Electric	805,772		
	Southern California Gas	5,266,356		
	Total	*10,102,501*	*32.4%*	
	EIA Regional Total	*10,432,623*		*15.2%*

	Number of Customers (2004)
Total For Sample	31,220,255
Industry Total *	68,748,753
Percentage of US Total	45.4%
Number of Sampled Firms	36

* Source for US Total: US Energy Information Administration, *Natural Gas Annual 2004*

Table 2

PRODUCTIVITY RESULTS: U.S. SAMPLE

Year	Output Quantity Index	Input Quantity Index	TFP Index	O&M PFP Index	US Private Business Sector
1994	1.000	1.000	1.000	1.000	93.7
1995	1.016	1.004	1.012	1.025	93.5
1996	1.029	1.005	1.024	1.048	95.1
1997	1.042	0.989	1.054	1.117	96.0
1998	1.045	0.984	1.062	1.154	97.5
1999	1.068	0.987	1.082	1.179	98.7
2000	1.087	0.992	1.095	1.179	100.0
2001	1.081	0.990	1.092	1.197	100.2
2002	1.094	0.993	1.102	1.214	101.8
2003	1.094	1.002	1.092	1.203	104.7
2004	1.102	1.010	1.091	1.200	107.7
Average Annual Growth Rate **1994-2004**	**0.97%**	**0.10%**	**0.87%**	**1.83%**	**1.39%**

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Table 3

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INPUT QUANTITY INDEXES: U.S. GAS DISTRIBUTION SAMPLE

Year	Summary Input Quantity Index	Input Quantity Subindexes		
		Labor	Materials & Services	Capital (Geometric Decay)
1994	1.000	1.000	1.000	1.000
1995	1.004	0.928	1.132	1.012
1996	1.005	0.914	1.131	1.022
1997	0.989	0.898	1.038	1.030
1998	0.984	0.855	1.058	1.037
1999	0.987	0.855	1.064	1.041
2000	0.992	0.790	1.198	1.046
2001	0.990	0.742	1.261	1.049
2002	0.993	0.780	1.192	1.054
2003	1.002	0.782	1.215	1.062
2004	1.010	0.740	1.314	1.069
Average Annual Growth Rate 1994-2004	**0.10%**	**-3.00%**	**2.73%**	**0.67%**

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Table 4

OUTPUT QUANTITY INDEXES: U.S. GAS DISTRIBUTION SAMPLE

Year	Summary Output		Quantity Subindexes		
	Cost Elasticity Weights	Fixed Revenue Weights	Customer Numbers	Residential and Commercial Deliveries	Other Deliveries
1994	1.000	1.000	1.000	1.000	1.000
1995	1.016	1.015	1.019	1.027	0.982
1996	1.029	1.022	1.037	1.041	0.959
1997	1.042	1.030	1.056	1.060	0.930
1998	1.045	1.009	1.075	1.036	0.871
1999	1.068	1.033	1.095	1.054	0.913
2000	1.087	1.054	1.113	1.077	0.933
2001	1.081	1.009	1.137	1.036	0.814
2002	1.094	1.026	1.148	1.055	0.830
2003	1.094	1.016	1.163	1.081	0.737
2004	1.102	1.011	1.178	1.063	0.737
Average Annual Growth Rate 1994-2004	0.97%	0.11%	1.63%	0.61%	-3.05%

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Table 5

PRODUCTIVITY RESULTS: ONTARIO

Year	Output Quantity Index Cost Elasticity Weights		Input Quantity Index GD Capital Cost		COS Capital Cost		TFP Index GD Capital Cost		COS Capital Cost		O&M PFP Index	
	Union	Enbridge	Union	Enbridge	Union	Enbridge	Union	Enbridge	Union	Enbridge	Union	Enbridge
1999	1.000		1.000		1.000		1.000		1.000		1.000	
2000	1.021	1.000	0.975	1.000	0.973	1.000	1.047	1.000	1.049	1.000	1.134	1.000
2001	1.021	1.027	0.975	1.025	0.976	1.025	1.047	1.001	1.046	1.002	1.119	0.966
2002	1.061	1.047	1.003	1.016	1.009	1.014	1.059	1.030	1.052	1.033	1.061	1.047
2003	1.075	1.093	1.000	1.062	0.998	1.065	1.075	1.029	1.077	1.026	1.121	0.944
2004	1.092	1.115	0.983	1.076	0.980	1.079	1.112	1.036	1.114	1.033	1.158	0.936
2005	1.116	1.137	0.966	1.080	0.966	1.088	1.156	1.053	1.156	1.045	1.203	0.953
Average Annual Growth Rate												
1999-2005	**1.84%**	**NA**	**-0.58%**	**NA**	**-0.58%**	**NA**	**2.42%**	**NA**	**2.41%**	**NA**	**3.08%**	**NA**
2000-2005	**1.78%**	**2.57%**	**-0.20%**	**1.54%**	**-0.15%**	**1.68%**	**1.98%**	**1.03%**	**1.93%**	**0.88%**	**1.17%**	**-0.96%**

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Table 6

INPUT QUANTITY INDEXES: ONTARIO

| | Summary Input Quantity Indexes | | | | Input Quantity Subindexes | | | | | | | | | |
| | GD Capital Cost | | COS Capital Cost | | Labour | | Non-Labour | | Fuel | | Capital: GD Capital Cost | | Capital: COS Capital Cost | |
Year	Union	Enbridge	Union	Enbridge	Union	Enbridge	Union	Enbridge	Union	Enbridge	Union	Enbridge	Union	Enbridge
1999	1.000		1.000		1.000		1.000		1.000	NA	1.000		1.000	
2000	0.975	1.000	0.973	1.000	0.876	0.549	0.936	1.500	1.459	NA	1.003	1.000	1.003	1.000
2001	0.975	1.025	0.976	1.025	0.875	0.557	0.968	1.627	1.251	NA	1.002	1.011	1.006	1.010
2002	1.003	1.016	1.009	1.014	0.903	0.475	1.144	1.596	1.346	NA	1.003	1.020	1.008	1.020
2003	1.000	1.062	0.998	1.065	0.881	0.517	1.075	1.892	1.874	NA	1.002	1.031	0.996	1.026
2004	0.983	1.076	0.980	1.079	0.828	0.563	1.120	1.907	1.700	NA	0.989	1.037	0.983	1.032
2005	0.966	1.080	0.966	1.088	0.851	0.584	1.040	1.880	1.601	NA	0.975	1.043	0.973	1.044
Average Annual Growth Rate														
1999-2005	**-0.58%**	**NA**	**-0.58%**	**NA**	**-2.69%**	**NA**	**0.65%**	**NA**	**7.84%**	**NA**	**-0.43%**	**NA**	**-0.46%**	**NA**
2000-2005	**-0.20%**	**1.54%**	**-0.15%**	**1.68%**	**-0.58%**	**1.25%**	**2.11%**	**4.51%**	**1.86%**	**NA**	**-0.57%**	**0.84%**	**-0.60%**	**0.86%**

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Table 7

OUTPUT QUANTITY INDEXES: ONTARIO

| | Summary Output Quantity Indexes | | | | Output Quantity Subindexes | | | | | |
| | Cost Elasticity Weights | | Fixed Revenue Weights | | Customers | | Residential & Commercial Volume | | Other Volume | |
Year	Union	Enbridge	Union	Enbridge	Union[1]	Enbridge[2]	Union[1]	Enbridge[2]	Union[1]	Enbridge[2]
1999	1.000		1.000		1,103,636		5,014		29,613	
2000	1.021	1.000	1.024	1.000	1,123,523	1,464,738	5,164	7,179	30,525	4,597
2001	1.021	1.027	1.021	1.026	1,146,376	1,519,039	5,009	7,423	27,635	4,372
2002	1.061	1.047	1.059	1.022	1,171,277	1,566,710	5,241	7,250	32,023	4,392
2003	1.075	1.093	1.083	1.097	1,195,115	1,622,016	5,410	8,000	30,082	4,479
2004	1.092	1.115	1.083	1.097	1,224,276	1,676,380	5,210	7,897	31,169	4,389
2005	1.116	1.137	1.079	1.110	1,248,510	1,724,716	5,284	7,977	32,632	4,263
Average Annual Growth Rate										
1999-2005	1.84%	NA	1.27%	NA	2.06%	NA	0.87%	NA	1.62%	NA
2000-2005	1.78%	2.57%	1.05%	2.08%	2.11%	3.27%	0.46%	2.11%	1.33%	-1.51%

[1]Union's output quantities are based on actuals that includes volumes saved due to DSM. Residential and commercial volume was weather normalized by PEG.

[2]Enbridge output quantities are based on actual data that includes volumes saved due to DSM. Residential and commercial volume was normalized by PEG

Sources of Productivity Growth

trend in TFP = trend Input Prices – trend Unit Cost

Theoretical & empirical work has identified sources of TFP growth

Short Run Effects

- Capacity utilization
- Volume/customer
- Reduced "X-Inefficiency"

Long Run Effects

- Technological change
- Scale economies
- Change in other business conditions
- Scope Economies

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Table 8

CHOOSING TFP PEERS FOR ENBRIDGE

Arithmetic Sample Average fn	0.79%	1.17%	-1.40%	
Peer Average	**1.34%**	**2.60%**	**0.03%**	
Enbridge	1.03%	2.57%		

		Expected Scale Economies		
Company	**TFP**	Company	vs. Enbridge	Peer
Southwest Gas	**2.6%**	4.5%	1.9%	
Cascade Natural Gas	**3.2%**	3.9%	1.4%	
Northwest Natural Gas	**1.8%**	3.5%	0.9%	1
Public Service of NC	**0.4%**	3.3%	0.7%	1
Washington Natural Gas	**0.6%**	2.8%	0.2%	1
Connecticut Energy	**2.4%**	2.5%	-0.1%	1
New Jersey Natural	**1.5%**	2.4%	-0.1%	1
Madison Gas & Electric	**0.8%**	2.2%	-0.4%	1
Wisconsin Power & Light	**1.9%**	2.1%	-0.4%	1
Mountain Fuel Supply	**1.2%**	2.0%	-0.5%	1
San Diego Gas & Electric	**-0.5%**	1.6%	-0.9%	
Louisville Gas & Electric	**0.3%**	1.4%	-1.1%	
PG Energy	**1.3%**	1.3%	-1.2%	
Atlanta Gas Light	**1.1%**	1.3%	-1.3%	
Wisconsin Gas	**1.6%**	1.2%	-1.3%	
Northern Illinois Gas	**0.9%**	1.2%	-1.4%	
PECO	**0.5%**	1.2%	-1.4%	
North Shore Gas	**1.7%**	1.1%	-1.5%	
Consumers Power	**0.2%**	1.0%	-1.5%	
Pacific Gas & Electric	**1.8%**	0.8%	-1.8%	
East Ohio Gas	**1.9%**	0.7%	-1.9%	
Central Hudson Gas & Electric	**1.0%**	0.6%	-1.9%	
Nstar Gas	**1.9%**	0.6%	-1.9%	
Washington Gas Light	**-0.1%**	0.6%	-2.0%	
Southern California Gas	**1.1%**	0.6%	-2.0%	
Baltimore Gas and Electric	**0.3%**	0.6%	-2.0%	
Rochester Gas and Electric	**0.8%**	0.5%	-2.0%	
Public Service Electric & Gas	**-0.9%**	0.3%	-2.2%	
Alabama Gas	**-1.9%**	0.3%	-2.3%	
Niagara Mohawk	**0.9%**	0.2%	-2.4%	
Illinois Power	**2.2%**	0.2%	-2.4%	
Consolidated Edison	**0.5%**	0.1%	-2.5%	
People's Natural Gas	**0.3%**	0.0%	-2.5%	
Orange and Rockland	**-3.0%**	-1.0%	-3.6%	
Peoples Gas Light & Coke	**-0.4%**	-1.4%	-4.0%	
Connecticut Natural Gas	**-1.6%**	-2.1%	-4.7%	

fn Average TFP trend will differ from that based on a size-weighted average of the company results.

Table 9

CHOOSING TFP PEERS FOR UNION

Arithmetic Sample Average fn		0.79%	1.17%	-0.61%
Peer Average		**0.94%**	**1.81%**	**0.03%**
Union		1.98%	1.78%	

Company	TFP	Expected Scale Economies		Peer
		Company	vs. Union	
Southwest Gas	**2.6%**	4.5%	2.7%	
Cascade Natural Gas	**3.2%**	3.9%	2.2%	
Northwest Natural Gas	**1.8%**	3.5%	1.7%	
Public Service of NC	**0.4%**	3.3%	1.5%	
Washington Natural Gas	**0.6%**	2.8%	1.0%	
Connecticut Energy	**2.4%**	2.5%	0.7%	
New Jersey Natural	**1.5%**	2.4%	0.6%	1
Madison Gas & Electric	**0.8%**	2.2%	0.4%	1
Wisconsin Power & Light	**1.9%**	2.1%	0.4%	1
Mountain Fuel Supply	**1.2%**	2.0%	0.3%	1
San Diego Gas & Electric	**-0.5%**	1.6%	-0.2%	1
Louisville Gas & Electric	**0.3%**	1.4%	-0.4%	1
PG Energy	**1.3%**	1.3%	-0.5%	1
Atlanta Gas Light	**1.1%**	1.3%	-0.5%	1
Wisconsin Gas	**1.6%**	1.2%	-0.6%	
Northern Illinois Gas	**0.9%**	1.2%	-0.6%	
PECO	**0.5%**	1.2%	-0.6%	
North Shore Gas	**1.7%**	1.1%	-0.7%	
Consumers Power	**0.2%**	1.0%	-0.7%	
Pacific Gas & Electric	**1.8%**	0.8%	-1.0%	
East Ohio Gas	**1.9%**	0.7%	-1.1%	
Central Hudson Gas & Electric	**1.0%**	0.6%	-1.1%	
Nstar Gas	**1.9%**	0.6%	-1.2%	
Washington Gas Light	**-0.1%**	0.6%	-1.2%	
Southern California Gas	**1.1%**	0.6%	-1.2%	
Baltimore Gas and Electric	**0.3%**	0.6%	-1.2%	
Rochester Gas and Electric	**0.8%**	0.5%	-1.3%	
Public Service Electric & Gas	**-0.9%**	0.3%	-1.4%	
Alabama Gas	**-1.9%**	0.3%	-1.5%	
Niagara Mohawk	**0.9%**	0.2%	-1.6%	
Illinois Power	**2.2%**	0.2%	-1.6%	
Consolidated Edison	**0.5%**	0.1%	-1.7%	
People's Natural Gas	**0.3%**	0.0%	-1.8%	
Orange and Rockland	**-3.0%**	-1.0%	-2.8%	
Peoples Gas Light & Coke	**-0.4%**	-1.4%	-3.2%	
Connecticut Natural Gas	**-1.6%**	-2.1%	-3.9%	

fn Average TFP trend will differ from that based on a size-weighted average of the company results.

Table 19

Econometric Model of Total Gas Utility Cost

VARIABLE KEY

L = Labor Price
K = Capital Price
N = Number of Customers
VRC = Weather Adjusted Residential & Commercial Deliveries
VO = Other Deliveries
NIM = % Non-Iron Miles in Distribution Miles
NE = Number of Electric Customers
UD = Urban Core Dummy
Trend = Time Trend

EXPLANATORY VARIABLE	ESTIMATED COEFFICIENT	T-STATISTIC	EXPLANATORY VARIABLE	ESTIMATED COEFFICIENT	T-STATISTIC
L	0.222	15.20	**VRC**	0.132	4.37
LL	-0.372	-2.86	VRCVRC	-0.564	-3.28
LK	-0.097	-6.90	VRCVO	0.106	2.11
LN	0.032	2.78			
LVRC	-0.051	-4.84	**VO**	0.095	4.77
LVO	0.009	2.27	VOVO	0.118	5.93
LTrend	0.001	0.41			
			NIM	-0.627	-11.81
K	0.562	93.01			
KK	0.158	11.75	**NE**	-0.006	-5.97
KN	-0.101	-6.99			
KVRC	0.081	5.95	**UD**	0.045	3.42
KVO	0.024	5.97			
KTrend	0.007	6.61	Trend	-0.011	-4.99
N	0.645	17.49	Constant	8.177	369.38
NN	0.187	0.94			
NVRC	0.191	1.09	System Rbar-Squared	0.983	
NVO	-0.216	-3.83			
			Sample Period	1994-2004	
			Number of Observations	396	

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Table 10

TFP GROWTH PROJECTIONS FROM ECONOMETRIC RESEARCH

	Enbridge	Union	US Mean
Sample Years	2000-2005	2000-2005	1994-2004
Technological Change [A]	**1.06%**	**1.06%**	**1.06%**
Returns to Scale [B]	**0.31%**	**0.23%**	**0.13%**
Sum of Output Elasticities	0.87	0.87	0.87
Output Growth (elasticity weighted)	2.42%	1.79%	0.98%
Output Parameters			
Customers	*0.64*	*0.64*	*0.64*
RC Deliveries	*0.13*	*0.13*	*0.13*
Other Deliveries	*0.09*	*0.09*	*0.09*
Weight - Customers	74.04%	74.04%	74.04%
Weight - RC Deliveries	15.10%	15.10%	15.10%
Weight - Other Deliveries	10.86%	10.86%	10.86%
Customer Growth	3.13%	2.11%	1.64%
RC Delivery Growth	1.32%	0.55%	0.61%
Other Delivery Growth	-0.92%	1.31%	-3.01%
TFP Projection [A + B]	**1.37%**	**1.29%**	**1.18%**

Final TFP Targets

Enbridge

CK^{GD} Econometric cost projection = 1.37%

CK^{COS} 1.22%

Union

CK^{GD} 0.5 x (Econometric projection + actual trend)

                    = 0.5 x (1.29 + 1.98) = 1.63

CK   1.58

No evidence of need for special cast iron adjustment

Final Productivity Differentials

Relevant sample period for TFP^{Canada} is that from *IPD* comparison

Enbridge

CK^{GD} 1.37% - 1.37 = 0.00

CK^{COS} 1.22% - 1.21 = 0.01

Union

CK^{GD} 1.63 - 1.37 = 0.26

CK   1.58 – 1.21 = 0.37

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Stretch Factor

Stretch factor should share benefits of superior performance under IR plan

Precedents: 0.5% average

Depends, in principle, on difference between performance incentives

- faced by sampled utilities
- generated by the IR plan

Straw Man Proposal: take average of the results

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Table 1 (cont) X FACTORS APPROVED IN INDEXING PLANS FOR GAS AND ELECTRIC UTILITIES								
Industry	Company	Term	Jurisdiction	Acknowledged Productivity Trend	Inflation Measure (P)	Stretch Factor	X-Factor	Comments
All utilities	Sample Average			0.88%		0.49%	1.28%	
All, industry specific P	Sample Average						1.58%	
All, macroeconomic P	Sample Average						1.27%	
Power distribution	Sample Average			1.35%			1.44%	
Power distribution, industry specific P	Sample Average						1.49%	
Power distribution, macroeconomic P	Sample Average						1.42%	
Gas distribution	Sample Average			0.58%			1.19%	
Gas distribution, industry specific P	Sample Average						1.77%	
Gas distribution, macroeconomic P	Sample Average						1.00%	

Incentive Plan Design for Ontario's Gas Utilities

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20% initial inefficiency	Net Present Value ($m) of:			Customer Share of Savings	Relative Incentive Power	Average Annual Performance Gain			
	Company Profits	Customer Benefits	Cost Reduction			1st Rate Cycle	2nd rate cycle	3rd rate cycle	Long run
Reference Regulatory Options									
Cost plus	0	0	0	-	**0%**	0.00%	0.00%	0.00%	0.00%
1 Year Cost of Service	46	739	770	96%	**35%**	0.88%	0.21%	0.11%	0.25%
2 Year Cost of Service	341	375	698	54%	**32%**	0.71%	0.49%	0.49%	0.47%
3 Year Cost of Service	484	577	1039	56%	**48%**	1.05%	0.89%	1.09%	0.85%
Full Rate Externalization	2208	0	2176	0%	**100%**	4.27%	4.12%	3.60%	2.21%
Impact of Plan Term									
Term = 3 years	484	577	1039	56%	**48%**	1.05%	0.89%	1.09%	0.85%
Term = 5 years	649	677	1305	52%	**60%**	1.40%	1.45%	1.49%	1.56%
Term = 6 years	711	745	1433	52%	**66%**	1.61%	0.97%	1.72%	1.69%
Term = 10 years	928	755	1659	45%	**76%**	2.07%	2.28%	2.35%	2.00%

Incentive Plan Design for Ontario's Gas Utilities

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Stretch Factor (*cont'd*)

Final Calculations

	Precedent	Incentive Power	Stretch
Enbridge	0.50	0.84/2	0.46
Union	0.50	0.20/2	0.30

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Average Use Factor

$AU = \text{trend Output}_R - \text{trend Output}_E$

Enbridge, Union both experienced declining average use over sample period

Problem was, surprisingly, modestly worse for Union than for Enbridge

Weather normalization plays key role in AU calculations

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Volume Per Customer Trends by Enbridge Rate Class

Rate 1 (Residential)

Year	Volumes				Customers		Volume Per Customer				Enbridge Stakeholder Presentation
	Actual	Forecasted	Normalized		Actual	Forecasted	Actual	Forecasted	Normalized		
			PEG	Enbridge					PEG	Enbridge	
	[A]	[B]	[C]	[D]	[E]	[F]	[G]=1000*[A]/[E]	[H]=[B]/[F]	[I]=1000*[C]/[E]	[J]=1000*[D]/[E]	
2000	4,008	4,266,360	4,088	4,283	1,325,938	1,328,659	3.023	3.211	3.083	3.230	3,043
2001	4,228	4,163,327	4,196	4,147	1,377,459	1,373,517	3.070	3.031	3.046	3.010	2,940
2002	4,002	4,203,965	4,165	4,233	1,423,525	1,418,180	2.812	2.964	2.926	2.973	2,929
2003	4,735	4,241,724	4,568	4,242	1,476,603	1,468,966	3.207	2.888	3.094	2.873	2,900
2004	4,596	4,241,724	4,557	4,342	1,529,297	1,468,966	3.006	2.888	2.980	2.839	2,850
2005	4,620	4,626,802	4,604	4,548	1,575,322	1,568,544	2.932	2.950	2.923	2.887	2,779
2000-2005	**2.84%**	**1.62%**	**2.38%**	**1.20%**	**3.45%**	**3.32%**	**-0.61%**	**-1.70%**	**-1.07%**	**-2.25%**	**-1.82%**

Rate 6 (General Service)

Year	Volumes				Customers		Volume Per Customer				Enbridge Stakeholder Presentation
	Actual	Forecasted	Normalized		Actual	Forecasted	Actual	Forecasted	Normalized		
			PEG	Enbridge					PEG	Enbridge	
	[A]	[B]	[C]	[D]	[E]	[F]	[G]=1000*[A]/[E]	[H]=[B]/[F]	[I]=1000*[C]/[E]	[J]=1000*[D]/[E]	
2000	2,999	3,175,841	3,050	3,219	136,025	138,575	22.050	22.918	22.422	23.663	22,138
2001	3,200	3,148,327	3,179	3,139	138,779	138,443	23.058	22.741	22.907	22.619	21,930
2002	2,932	3,200,782	3,032	3,110	140,351	144,102	20.888	22.212	21.603	22.156	21,785
2003	3,485	3,119,887	3,381	3,095	142,656	143,293	24.430	21.773	23.700	21.694	21,816
2004	3,314	3,119,887	3,290	3,110	144,331	143,293	22.959	21.773	22.795	21.548	21,527
2005	3,327	3,324,324	3,317	3,271	146,672	147,475	22.681	22.542	22.615	22.301	21,131
2000-2005	**2.07%**	**0.91%**	**1.68%**	**0.32%**	**1.51%**	**1.25%**	**0.56%**	**-0.33%**	**0.17%**	**-1.19%**	**-0.93%**

Rate 100 (Large Volume Firm)

Year	Volumes				Customers		Volume Per Customer				Enbridge Stakeholder Presentation
	Actual	Forecasted	Normalized		Actual	Forecasted	Actual	Forecasted	Normalized		
			PEG	Enbridge					PEG	Enbridge	
	[A]	[B]	[C]	[D]	[E]	[F]	[G]=1000*[A]/[E]	[H]=[B]/[F]	[I]=1000*[C]/[E]	[J]=1000*[D]/[E]	
2000	1,395	1,480,125	1,412	NA	2,019	1,993	691.035	742.662	699.356	NA	NA
2001	1,405	1,425,997	1,398	NA	2,043	1,911	687.714	746.205	684.288	NA	NA
2002	1,358	1,393,737	1,391	NA	2,087	1,956	650.455	712.544	666.507	NA	NA
2003	1,466	1,394,623	1,434	NA	2,029	2,007	722.425	694.822	706.752	NA	NA
2004	1,433	1,394,623	1,425	NA	2,069	2,007	692.412	694.822	688.739	NA	NA
2005	1,421	1,401,603	1,418	NA	2,065	1,985	687.893	706.127	686.683	NA	NA
2000-2005	**0.36%**	**-1.09%**	**0.08%**	**NA**	**0.45%**	**-0.08%**	**-0.09%**	**-1.01%**	**-0.37%**	**NA**	**NA**

Volume Per Customer Trends by Union Overall Rate Class

Rate M2: (General Service South, includes residential)

Year	Volumes			Customers	Volume Per Customer[1]			
	Actual	Weather Normalized		Actual	Actual	Weather Normalized		Union Stakeholder Presentation
		PEG	Union			PEG	Union	
	[A]	[B]	[C]	[D]	[E]=1000*[A]/[D]	[F]=1000*[B]/[D]	[G]=1000*[C]/[D]	
1999	3,748	3,784		836,601				NA
2000	3,898	3,843	3,897	848,719	4.593	4.528	4.592	NA
2001	3,668	3,773	3,902	869,021	4.221	4.342	4.490	NA
2002	3,911	3,951	4,054	890,233	4.393	4.438	4.554	NA
2003	4,164	4,074	3,948	911,282	4.569	4.471	4.332	NA
2004	3,945	3,925	3,976	935,557	4.217	4.195	4.250	NA
2005	4,028	4,010	4,015	956,004	4.213	4.195	4.200	NA
2000-2005	**0.66%**	**0.85%**	**0.60%**	**2.38%**	**-1.72%**	**-1.53%**	**-1.78%**	**NA**

Rate 01: (General Service North, includes residential)

Year	Volumes			Customers	Volume Per Customer[1]			
	Actual	Weather Normalized		Actual	Actual	Weather Normalized		Union Stakeholder Presentation
		PEG	Union			PEG	Union	
	[A]	[B]	[C]	[D]	[E]=1000*[A]/[D]	[F]=1000*[B]/[D]	[G]=1000*[C]/[D]	
1999	844	856		263,686				NA
2000	945	930	959	271,537	3.480	3.425	3.532	NA
2001	855	879	932	274,087	3.119	3.207	3.400	NA
2002	912	908	939	277,588	3.285	3.271	3.383	NA
2003	957	945	921	280,373	3.413	3.371	3.285	NA
2004	919	905	926	285,201	3.222	3.173	3.247	NA
2005	886	894	921	288,801	3.068	3.096	3.189	NA
2000-2005	**-1.29%**	**-0.79%**	**-0.81%**	**1.57%**	**-2.52%**	**-2.02%**	**-2.04%**	**NA**

Rate 10: (General Service North)

Year	Volumes			Customers	Volume Per Customer[1]			
	Actual	Weather Normalized		Actual	Actual	Weather Normalized		Union Stakeholder Presentation
		PEG	Union			PEG	Union	
	[A]	[B]	[C]	[D]	[E]=1000*[A]/[D]	[F]=1000*[B]/[D]	[G]=1000*[C]/[D]	
1999	355	359						NA
2000	386	382	396	2,631	146.712	145.192	150.513	NA
2001	348	355	367	2,632	132.219	134.878	139.438	NA
2002	382	381	387	2,841	134.460	134.108	136.220	NA
2003	394	390	380	2,842	138.635	137.227	133.709	NA
2004	384	380	384	2,914	131.778	130.405	131.778	NA
2005	385	388	397	3,114	123.635	124.599	127.489	NA
2000-2005	**-0.05%**	**0.31%**	**0.05%**	**3.37%**	**-3.42%**	**-3.06%**	**-3.32%**	**NA**

[1]All ratios were calculated using the actual customer data except for the forecasted ratio which used the forecasted customers.

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Table 18

Econometric Models For Weather Normalization: U.S. Gas Industry

VARIABLE KEY

yvrc = Residential and Commercial Throughput
yvres= Residential Throughput
yvcom= Commercial Throughput
HDD= Heating Degree Days for Each Region

Dependent Variable	ycrc		yvres		yvcom	
	Parameter Estimate[1]	T-statistic	Parameter Estimate	T-statistic	Parameter Estimate	T-statistic
constant	0.009	2.172	0.008	1.976	0.011	1.772
HDD	0.355	12.374	0.418	14.814	0.256	5.982
sample period	1994-2005		1994-2005		1994-2005	

1. Each HDD parameter is the elasticity of volume with respect to HDD due to the double log form of the model.

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Average Use Factor (*cont'd*)

Final AU Calculations

Enbridge $2.08 - 2.57 = -0.49$

Union $1.05 - 1.78 = -0.73$

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Summary of Results

	Geometric Decay		COS	
	Enbridge	**Union**	**Enbridge**	**Union**
TFP^{Industry} [A]	1.37	1.63	1.22	1.58
TFP^{Economy} [B]	1.37	1.37	1.21	1.21
PD [C=A-B]	**0.00**	**0.26**	**-0.01**	**0.37**
Input Prices^{Economy} [D]	2.94	2.94	2.90	2.90
Input Prices^{Industry} [E]	3.10	3.26	3.28	3.25
IPD [F=D-E]	-0.16	-0.33	-0.37	-0.35
gOutput$^{Revenue-Weighted}$ [G]	2.08	1.05	2.08	1.05
Output$^{Elasticity-Weighted}$ [H]	2.57	1.78	2.57	1.78
AU [I=G-H]	**-0.49**	**-0.73**	**-0.49**	**-0.73**
Stretch [J]	**0.46**	**0.30**	**0.46**	**0.30**
X [C+F+I+J]	**-0.19**	**-0.50**	**-0.39**	**-0.41**

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ADJ Factor

Price caps for individual service groups are not conventionally established using cost theory

Original theoretical research was required

Basic Idea

- Each service has a special impact on cost and revenue
- Calculate X adjustment that would be needed if this was the only service
- Make sure results are consistent with the summary PCI
- Rates for individual service groups may not be adjusted rationally for changing business conditions

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$$ADJ_\ell = \left[\left(\Delta Y_\ell^R - \Delta Y^R \right) + \left(\sum_i \Delta Y^E \varepsilon_i \Delta Y_i - \frac{R}{R_\ell} \sum_i \varepsilon_{i\ell} \Delta Y_{i\ell} \right) \right] \qquad \text{[A42]}$$

Table 17

Calculation of the ADJ Factors

Company Service	Share Volume Residential (2002)	Revenue Effect [A]	Cost Effect [B]	ADJ [A+B]
Enbridge				
Rate 1 (Residential)	100%	0.68%	-1.42%	-0.74%
Rate 6 (General Services)	0%	-0.40%	2.06%	1.66%
Rate 100 (Large Volume Firm)	0%	-2.01%	2.51%	0.50%
All Non-Residential Services	0%	-0.85%	2.21%	1.36%
Union				
Rate 01 (General Services North)	75%	-1.13%	0.81%	-0.32%
Rate M2 (General Services South)	54%	0.39%	-0.02%	0.37%
Rate 10 (General Services North)	0%	-0.21%	0.97%	0.76%
All Non-Residential Services	0%	-0.16%	-0.36%	-0.52%

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Service Group PCIs

Company	Service Group	Recent GDPIPI Trend [A]	Sum of Common Terms [B]	ADJ [C]	Total X Factor [D]=B+C	Indicated PCI Growth [A]-[D]
Enbridge	Rate 1	1.77	-0.19	-0.74	-0.93	2.70
	Nonresidential	1.77	-0.19	1.36	1.17	0.60
Union	Rate M2	1.77	-0.50	0.37	-0.13	1.90
	Rate 01	1.77	-0.50	-0.32	-0.82	2.50
	Nonresidential	1.77	-0.50	-0.52	-1.02	2.79

Rate Trends

Results of index research should be compared with actual rate trends

Interpretation of results is difficult since

- GDPIPI – X indexes don't reflect actual input price trends

- Utilities may have faced special operating conditions. Some would be Z factored

- Rate trends materially affected by rate redesign

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X FACTOR IMPLICIT IN GAS DISTRIBUTION RATES, 1991-2006

Year	GDP-PI		PPI Natural Gas Distribution - Delivered to ultimate consumers for the account of others (Transportation Only)		Implied X Factor
	Level	Growth Rate	Level	Growth Rate	
1991	84.5		96.8		
1992	86.4	2.28%	99.5	2.75%	
1993	88.4	2.27%	101.5	1.99%	
1994	90.3	2.10%	101.2	-0.30%	
1995	92.1	2.03%	106.9	5.48%	
1996	93.9	1.88%	105.7	-1.13%	
1997	95.4	1.64%	109.4	3.44%	
1998	96.5	1.10%	103.6	-5.45%	
1999	97.9	1.43%	102.3	-1.26%	
2000	100.0	2.16%	103.9	1.55%	
2001	102.4	2.37%	103.4	-0.48%	
2002	104.2	1.73%	105.5	2.01%	
2003	106.4	2.10%	108.2	2.53%	
2004	109.4	2.78%	113.3	4.61%	
2005	112.7	2.97%	116.1	2.44%	
2006	116.1	2.97%	125.4	7.71%	
Formula	**[A]**		**[B]**		**[A] - [B]**
Average 91-06	**2.12%**		**1.73%**		**0.40%**
Average 96-06	**2.13%**		**1.71%**		**0.42%**
Average 96-01	**1.74%**		**-0.44%**		**2.18%**
Average 01-06	**2.09%**		**3.22%**		**-1.12%**

Source, PPI Natural Gas Distribution Transportation Only: Bureau of Labor Statistics; http://www.bls.gov

Source, GDP-PI: Bureau of Economic Analysis; http://www.bea.gov

Table 16

Rate Index for Enbridge Gas

Year	Summary Rate Index[1] Flexible Weight[2]	Fixed Weight[3]	Residential & Commercial[4] Summary[3]	Rate 1 Customer Charge	Volume Charge	Summary[3]	Rate 6 Customer Charge	Volume Charge	Summary[3]	Other than Residential & Commercial Summary[3]	Other than Residential Summary[3]	Rate 100 Customer Charge	Volume Charge	Summary[3]	Rate110 Summary[3]	Rate 145 Summary[3]
2000	1.000	1.000	1.000	0.108	0.083	1.000	0.192	0.051	1.000	1.000	1.000	1.200	0.029	1.000	1.000	1.000
2001	1.030	1.034	1.030	0.120	0.082	1.030	0.216	0.052	1.030	1.075	1.043	1.200	0.032	1.084	1.023	1.218
2002	1.009	1.012	1.010	0.120	0.080	1.019	0.216	0.049	0.986	1.034	0.999	1.200	0.030	1.029	1.016	1.165
2003	1.054	1.060	1.064	0.120	0.086	1.067	0.264	0.051	1.055	1.020	1.045	1.200	0.032	1.094	0.989	1.261
2004	1.072	1.078	1.080	0.120	0.088	1.083	0.264	0.052	1.072	1.058	1.068	1.200	0.033	1.118	1.002	1.308
2005	1.058	1.071	1.069	0.135	0.081	1.074	0.264	0.051	1.058	1.088	1.066	1.200	0.035	1.192	0.894	0.999
2000-2005	1.13%	1.37%	1.34%	4.46%	-0.29%	1.42%	6.37%	-0.08%	1.12%	1.68%	1.28%	0.00%	3.67%	3.51%	-2.23%	-0.02%

[1]The summary rate indexes measure the trend in rates for all Enbridge services

[2]Weights are moving averages of rate element revenue shares

[3]Weights are fixed at 2005 rate element revenue shares

[4]Includes rate 1 and rate 6

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Table 17

Rate Index for Union Gas

| Year | Summary Rate Index | | Distribution | | | | | | | | Storage[1] | Transmission | Other Than General Service | Other Than Residential |
| | | | General Service | | | | Contract & Wholesale | | | | | | | Rate 10 + Other |
	Flexible Weights[2]	Fixed Weights[3]	Rate M2[3]	Rate 01[3]	Rate 10[3]	Summary[3]	Customer Charge	Volume Charge	Summary[3]		Demand Basis	Average of Parkway and Kirkwall rate	Summary[3]	Summary[3]
1999	1.000	1.000	1.000	1.000	1.000	1.000	2.097	0.0058	1.000		14,665	2.341	1.000	1.000
2000	1.020	1.028	1.033	0.980	0.990	1.019	2.222	0.0061	1.059		16,506	2.341	1.045	1.041
2001	1.038	1.047	1.025	0.989	0.878	1.015	2.384	0.0069	1.157		19,410	2.349	1.116	1.099
2002	1.073	1.084	1.038	1.012	0.988	1.033	2.415	0.0066	1.149		28,436	2.335	1.189	1.175
2003	1.053	1.084	1.097	1.003	0.926	1.071	2.364	0.0066	1.132		21,618	2.282	1.114	1.101
2004	1.052	1.105	1.154	1.011	0.795	1.103	2.372	0.0055	1.068		27,327	2.151	1.107	1.085
2005	1.049	1.111	1.181	1.029	0.795	1.124	2.438	0.0048	1.035		29,489	2.028	1.081	1.060
2000-2005	0.55%	1.55%	2.68%	0.98%	-4.38%	1.98%	1.85%	-4.64%	-0.45%		11.61%	-2.88%	0.68%	0.36%

[1]Storage rate is calculated crudely as Storage revenue/Contract Demand

[2]Weights are moving averages of rate element revenue shares

[3]Weights are fixed at 2005 rate element revenue shares

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