Enbridge #1

INTERROGATORY

Ref: General

Issue Number:
Issue:

Please produce all communications between Board Staff, intervenors, and PEG with respect to the X-factor that occurred after the initial release of the March 2007 report.

RESPONSE

This question asks for material covered by privilege, which privilege has not been waived by Board staff.

Enbridge #16

INTERROGATORY

Ref: Econometric Cost Model and Productivity Differential

Issue Number:
Issue:

On Page 84, PEG claims,

> "The results of econometric research are useful in selecting business conditions for cost models. Specifically, tests can be constructed for the hypothesis that the parameter for a business condition variable under consideration equals zero. A variable can be deemed a statistically significant cost driver if this hypothesis is rejected at a high level of confidence. It is sensible to exclude from the model candidate business condition variables that do not have statistically significant parameter estimates, as well as those with implausible parameter estimates. Once such variables have been removed, the model is re-estimated. An econometric model in which business condition variables are selected in this manner is not a 'black box' that confounds earnest attempts at appraisal."

a. Please identify all candidate business condition variables that were considered or tested for potential inclusion in the econometric cost model relied upon for PEG's Ontario work.
b. Please provide all data associated with the candidate business condition variables identified in a. in usable electronic form.
c. Please provide all computer code, spreadsheets and other work papers associated with tests performed to consider excluding or including candidate business condition variables in the econometric cost model relied upon for PEG's Ontario work.

RESPONSE

a. The additional candidate business condition variable considered in our work for the Board was line miles. We added line miles as a business condition variable in several versions of the model (*e.g.* versions with and without interaction terms and with and without the urban core dummy). In all of the runs considered, the addition of this variable caused the "other"

Witness: Mark Lowry

(*e.g.* not residential or commercial) delivery volume variable to be statistically insignificant. There were, additionally, more negative estimates of output elasticities. Due solely to our interest in having two volume variables in the models so as to make them applicable to both Enbridge and Union, we elected not to use the line miles variable.

b. See the datasets included in the working papers folder (3.2). The variable named ymdm signifies line miles. Please remember that these data are confidential.

c. The attached file "EGD-16 Attachment" provides details of two representative runs that prompted us to make this decision. Please note that both models are identical to the model featured in testimony save for the addition of the line miles variable.

```
» run C:\Work\oebgas\Specification\DR_TC;

*******************************************************************************

 Date:  6/02/07 ****    STANDARD SUR ESTIMATION RESULTS   ****   Time: 14:14:38

                        OUTPUT FILE:C:\work\Oebgas\results\out

                            DATA FILE:C:\work\Oebgas\oebgas5.xls

*******************************************************************************

                                DEFINITIONS OF OUTPUT VARIABLES:

                                Y1 is number of customers.

                                Y2 is weather adjusted residential & commerical deliveries

                                Y3 is other delivieries

                                DEFINITIONS OF BUSINESS CONDITION VARIABLES:

                                Z1 is % of non-iron miles in Dx miles

                                Z2 is Number of Electric Customers

                                Z3 is Urban Core Dummy

                                Z4 is Miles of Distribution Main

                                Model includes time trend.

                     Time period used: 1994 through 2004


*******************************************************************************
                           GAUSS Data Import Facility
*******************************************************************************

Begin import...
Import completed
Number of rows in input file:                  413
Number of cases written to GAUSS data set:     412
Number of missing elements:                     63
Number of variables written to GAUSS data set:  21
  1
409
===============================================================================
 SEEMINGLY UNRELATED REGRESSION WITH HETEROSKEDASTICITY    6/02/2007   2:14 pm
===============================================================================
                      Data Set:  C:\work\Oebgas\Temp_3.dat
-------------------------------------------------------------------------------


DIVISOR USING N IN EFFECT
RESTRICTIONS IN EFFECT

        ITER. # =    0    LOG OF DETERMINANT OF SIGMA =     5.11275375
        ITER. # =    1    LOG OF DETERMINANT OF SIGMA =     5.04568801
        ITER. # =    2    LOG OF DETERMINANT OF SIGMA =     5.04519685
        ITER. # =    3    LOG OF DETERMINANT OF SIGMA =     5.04519232
        ITER. # =    4    LOG OF DETERMINANT OF SIGMA =     5.04519227
        ITER. # =    5    LOG OF DETERMINANT OF SIGMA =     5.04519226
        ITER. # =    6    LOG OF DETERMINANT OF SIGMA =     5.04519226

                  ---------------------------------
                             Equation:   1
```

Dependent variable: C

Total cases:	396	Valid cases:	396
Total SS:	316.905	Degrees of freedom:	----
R-squared:	0.974	Rbar-squared:	0.973
Residual SS:	8.310	Std error of est:	2.540
Durbin-Watson:	0.281		

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	8.17505271	0.02334829	350.135	0.0000
WL	0.22987459	0.01456593	15.782	0.0000
WK	0.56352423	0.00604423	93.233	0.0000
Y1	0.49693688	0.04144028	11.992	0.0000
Y2	0.16900403	0.02953300	5.723	0.0000
Y3	0.02178039	0.01872864	1.163	0.2456
WLWL	-0.30387040	0.12950832	-2.346	0.0195
WLWK	-0.09134910	0.01398169	-6.533	0.0000
WKWK	0.15064930	0.01343241	11.215	0.0000
Y1Y1	0.12309241	0.03531011	3.486	0.0005
Y2Y2	-0.20167894	0.03895477	-5.177	0.0000
Y3Y3	0.01283309	0.01322626	0.970	0.3325
WLY1	0.03379176	0.01150265	2.938	0.0035
WLY2	-0.05377540	0.01058866	-5.079	0.0000
WLY3	0.00873990	0.00390267	2.239	0.0257
WKY1	-0.09882411	0.01443856	-6.844	0.0000
WKY2	0.08092479	0.01366382	5.923	0.0000
WKY3	0.02387772	0.00403789	5.913	0.0000
Z1	-0.82748207	0.07277882	-11.370	0.0000
Z2	-0.00703081	0.00111520	-6.305	0.0000
Z3	0.03468218	0.01452655	2.388	0.0174
Z4	0.22675061	0.03029204	7.485	0.0000
TREND	-0.01238854	0.00211477	-5.858	0.0000
WLTREND	-0.00032750	0.00279396	-0.117	0.9067
WKTREND	0.00640272	0.00099144	6.458	0.0000

Equation: 2

Dependent variable: SL

Total cases:	396	Valid cases:	396
Total SS:	1.940	Degrees of freedom:	----
R-squared:	0.074	Rbar-squared:	0.092
Residual SS:	1.797	Std error of est:	2.368
Durbin-Watson:	0.405		

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	0.22987459	0.01456593	15.782	0.0000
WL	-0.30387040	0.12950832	-2.346	0.0194
WK	-0.09134910	0.01398169	-6.533	0.0000
Y1	0.03379176	0.01150265	2.938	0.0035
Y2	-0.05377540	0.01058866	-5.079	0.0000
Y3	0.00873990	0.00390267	2.239	0.0257
TREND	-0.00032750	0.00279396	-0.117	0.9067

Equation: 3

Dependent variable: SK

Total cases:	396	Valid cases:	396
Total SS:	2.429	Degrees of freedom:	----
R-squared:	0.212	Rbar-squared:	0.228
Residual SS:	1.914	Std error of est:	2.975

Durbin-Watson: 0.344

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	0.56352423	0.00604423	93.233	0.0000
WL	-0.09134910	0.01398169	-6.533	0.0000
WK	0.15064930	0.01343241	11.215	0.0000
Y1	-0.09882411	0.01443856	-6.844	0.0000
Y2	0.08092479	0.01366382	5.923	0.0000
Y3	0.02387772	0.00403789	5.913	0.0000
TREND	0.00640272	0.00099144	6.458	0.0000

Equation: 4
Dependent variable: SM

Valid cases: 396
Degrees of freedom: ----

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	0.20660118	0.01465278	14.100	0.0000
WL	0.39521950	0.12972407	3.047	0.0026
WK	-0.05930021	0.01270007	-4.669	0.0000
Y1	0.06503235	0.01189852	5.466	0.0000
Y2	-0.02714940	0.01112577	-2.440	0.0155
Y3	-0.03261761	0.00351438	-9.281	0.0000

MEASURES OF GOODNESS-OF-FIT

AN UNCENTERED SYSTEM R-SQUARE 0.982

A CENTERED SYSTEM R-SQUARE 0.982

The results from the test of the null hypothesis that all slope coefficients in all equations are simultaneously equal to zero.

Test statistic	Prob > t
1591.153	+DEN

VALIDATION OF REGULARITY CONDITIONS

Monotonicity of the Estimated Cost Function

The number of observations for which each of the following predicted cost share is nonpositive is listed below

Labor	Capital	Materials
0 (0.00 %)	0 (0.00 %)	0 (0.00 %)

Concavity of the Estimated Cost Function

The number of the observations for which the condition that the matrix of second order partial derivatives of the cost function with respect to input wages is negative semi-definite holds:

396 (100.00 %)

Quasi-Concavity of the Estimated Cost Function

The number of observations for which the condition that the cost function is strictly quasi-concave in input prices holds:

396 (100.00 %)

Second Order Condition for Cost Minimization

The number of the observations for which the condition that the bordered Hessian is negative definite holds:

396 (100.00 %)

OUT-OF-SAMPLE PREDICTION OF TOTAL COST LEVEL PERFORMANCE LAST 3 YEARS

Actual	Predicted	Difference	t_ratio	p_value	Utility
8.307	8.673	-0.367	-4.403	0.000	East Ohio Gas
6.233	6.515	-0.282	-3.175	0.001	Madison Gas & Electric
8.819	9.085	-0.267	-2.981	0.001	NICOR
6.674	6.934	-0.260	-2.948	0.002	North Shore Gas
9.711	9.906	-0.195	-1.929	0.027	SOUTHERN CALIFORNIA GAS
6.802	6.975	-0.173	-2.119	0.017	Louisville Gas and Electric
7.533	7.700	-0.167	-1.961	0.025	Wisconsin Gas
8.443	8.574	-0.132	-1.539	0.062	Atlanta Gas Light
7.828	7.946	-0.118	-1.362	0.087	Questar (Mountain Fuel Supply)
7.322	7.434	-0.112	-1.301	0.097	Illinois Power
7.719	7.801	-0.082	-0.905	0.183	SAN DIEGO GAS & ELECTRIC
7.831	7.895	-0.064	-0.752	0.226	BALTIMORE GAS & ELECTRIC CO
8.895	8.930	-0.035	-0.400	0.345	Public Service Electric & Gas
7.179	7.212	-0.033	-0.386	0.350	Rochester Gas and Electric
6.599	6.631	-0.032	-0.362	0.359	Wisconsin Power & Light
7.353	7.379	-0.027	-0.311	0.378	People's Natural Gas
7.888	7.896	-0.008	-0.096	0.462	Northwest Natural Gas
7.200	7.205	-0.004	-0.049	0.481	COMMONWEALTH GAS
7.705	7.706	-0.001	-0.013	0.495	new Jersey Natural Gas
7.711	7.709	0.001	0.013	0.495	Alabama Gas
8.618	8.612	0.005	0.061	0.476	Consumers Power
8.521	8.491	0.029	0.337	0.368	Southwest Gas
8.632	8.602	0.029	0.308	0.379	Consolidated Edison
6.527	6.490	0.037	0.416	0.339	Orange & Rockland Utilities
7.072	7.035	0.037	0.385	0.350	Connecticut Natural Gas
7.096	7.051	0.045	0.488	0.313	Connecticut Energy
7.978	7.916	0.062	0.704	0.241	Washington Natural Gas
8.674	8.608	0.066	0.723	0.235	Peoples Gas Light
6.578	6.485	0.093	1.066	0.143	Pg Energy (Penn Gas & Water)
6.084	5.933	0.152	1.566	0.059	Central Hudson Gas
7.372	7.177	0.195	2.290	0.011	Public Service of North Carolina
7.028	6.791	0.237	2.570	0.005	Cascade Natural Gas
9.551	9.250	0.301	3.661	0.000	Pacific Gas & Electric
8.123	7.788	0.335	4.007	0.000	Niagra Mohawk
7.791	7.393	0.398	4.547	0.000	Peco (Philadelphia Electric)
8.511	8.062	0.449	5.888	0.000	Washington Gas Light

RTS (sum of output elasticities) calculated at all data points

sum	yn	yvrc	yvoth	utility
0.541	0.565	-0.055	0.030	ENBRIDGE

0.562	0.481	0.065	0.017	Peoples Gas Light
0.563	0.601	-0.072	0.034	NICOR
0.591	0.597	-0.031	0.025	Consumers Power
0.594	0.570	-0.006	0.031	Public Service Electric & Gas
0.598	0.510	0.094	-0.006	Washington Gas Light
0.604	0.525	0.050	0.028	East Ohio Gas
0.617	0.485	0.105	0.028	Consolidated Edison
0.635	0.444	0.168	0.023	Niagra Mohawk
0.644	0.527	0.057	0.060	UNION GAS
0.658	0.693	-0.080	0.045	Pacific Gas & Electric
0.670	0.273	0.406	-0.010	Connecticut Natural Gas
0.677	0.714	-0.088	0.050	SOUTHERN CALIFORNIA GAS
0.679	0.511	0.162	0.006	Questar (Mountain Fuel Supply)
0.683	0.444	0.231	0.008	Washington Natural Gas
0.687	0.599	0.070	0.018	Atlanta Gas Light
0.690	0.403	0.289	-0.003	People's Natural Gas
0.691	0.268	0.429	-0.006	North Shore Gas
0.699	0.426	0.267	0.006	Peco (Philadelphia Electric)
0.700	0.346	0.357	-0.003	COMMONWEALTH GAS
0.706	0.459	0.232	0.014	Wisconsin Gas
0.706	0.388	0.317	0.001	new Jersey Natural Gas
0.707	0.363	0.347	-0.003	Rochester Gas and Electric
0.713	0.472	0.233	0.008	BALTIMORE GAS & ELECTRIC CO
0.723	0.314	0.411	-0.001	Pg Energy (Penn Gas & Water)
0.724	0.243	0.480	0.001	Orange & Rockland Utilities
0.733	0.419	0.305	0.008	Illinois Power
0.737	0.274	0.485	-0.022	Madison Gas & Electric
0.743	0.399	0.350	-0.005	Louisville Gas and Electric
0.747	0.435	0.293	0.018	Northwest Natural Gas
0.748	0.584	0.145	0.018	Southwest Gas
0.753	0.296	0.462	-0.004	Connecticut Energy
0.777	0.428	0.332	0.017	Alabama Gas
0.781	0.419	0.361	0.001	Public Service of North Carolina
0.783	0.309	0.476	-0.002	Wisconsin Power & Light
0.800	0.162	0.642	-0.004	Central Hudson Gas
0.813	0.301	0.487	0.026	Cascade Natural Gas
0.825	0.486	0.318	0.021	SAN DIEGO GAS & ELECTRIC

****
****
****
****
****
****

» run C:\Work\oebgas\Specification\DR_TC;

****

Date: 6/07/07 **** STANDARD SUR ESTIMATION RESULTS **** Time: 10:55:16

OUTPUT FILE:C:\work\Oebgas\results\out

DATA FILE:C:\work\Oebgas\oebgas5.xls

****

DEFINITIONS OF OUTPUT VARIABLES:

Y1 is number of customers.

Y2 is weather adjusted residential & commerical deliveries

Y3 is other delivieries

Y4 is Miles of Distribution Main

DEFINITIONS OF BUSINESS CONDITION VARIABLES:

Z1 is % of non-iron miles in Dx miles

Z2 is Number of Electric Customers

Z3 is Urban Core Dummy

Model includes time trend.

Time period used: 1994 through 2004

```
**************************************************************************
                        GAUSS Data Import Facility
**************************************************************************

Begin import...
Import completed
Number of rows in input file:                 413
Number of cases written to GAUSS data set:     412
Number of missing elements:                    66
Number of variables written to GAUSS data set:  22
  1
409
==========================================================================
 SEEMINGLY UNRELATED REGRESSION WITH HETEROSKEDASTICITY    6/07/2007  10:55 am
==========================================================================
                     Data Set:  C:\work\Oebgas\Temp_3.dat
--------------------------------------------------------------------------


DIVISOR USING N IN EFFECT
RESTRICTIONS IN EFFECT

        ITER. # =    0    LOG OF DETERMINANT OF SIGMA =     5.12358120
        ITER. # =    1    LOG OF DETERMINANT OF SIGMA =     5.04805797
        ITER. # =    2    LOG OF DETERMINANT OF SIGMA =     5.04745548
        ITER. # =    3    LOG OF DETERMINANT OF SIGMA =     5.04745026
        ITER. # =    4    LOG OF DETERMINANT OF SIGMA =     5.04745019
        ITER. # =    5    LOG OF DETERMINANT OF SIGMA =     5.04745019
        ITER. # =    6    LOG OF DETERMINANT OF SIGMA =     5.04745019

                  ----------------------------------
                            Equation:   1
                     Dependent variable:         C
                  ----------------------------------

     Total cases:              396    Valid cases:                   396
     Total SS:             316.905    Degrees of freedom:            ----
     R-squared:              0.974    Rbar-squared:                 0.973
     Residual SS:            8.310    Std error of est:             2.253
     Durbin-Watson:          0.282

                   Estimated         Standard                        Prob
     Variable     Coefficient          Error         t-ratio        >|t|
     ------------------------------------------------------------------
     CONST          8.16067912       0.02188898      372.821       0.0000
     WL             0.22099364       0.01432891       15.423       0.0000
     WK             0.55710267       0.00613199       90.852       0.0000
     Y1             0.50838927       0.04027883       12.622       0.0000
     Y2             0.22464922       0.02870384        7.826       0.0000
     Y3            -0.02199443       0.02014221       -1.092       0.2755
```

Y4	0.21342775	0.03447222	6.191	0.0000
WLWL	-0.44409543	0.12848850	-3.456	0.0006
WLWK	-0.11374662	0.01424463	-7.985	0.0000
WKWK	0.17835761	0.01587100	11.238	0.0000
Y1Y1	0.36736353	0.05706070	6.438	0.0000
Y2Y2	-0.23978850	0.04016188	-5.971	0.0000
Y3Y3	-0.00574067	0.01388567	-0.413	0.6795
Y4Y4	-0.26319996	0.04870900	-5.404	0.0000
WLY1	0.08747791	0.01656923	5.280	0.0000
WLY2	-0.08411365	0.01189067	-7.074	0.0000
WLY3	0.01718623	0.00399137	4.306	0.0000
WLY4	-0.04541453	0.00940262	-4.830	0.0000
WKY1	-0.14735010	0.01885707	-7.814	0.0000
WKY2	0.10172310	0.01455194	6.990	0.0000
WKY3	0.01064822	0.00455228	2.339	0.0198
WKY4	0.05670857	0.01119117	5.067	0.0000
Z1	-0.97207158	0.07318609	-13.282	0.0000
Z2	-0.00662258	0.00110403	-5.999	0.0000
Z3	0.04959643	0.01318798	3.761	0.0002
TREND	-0.01161628	0.00207056	-5.610	0.0000
WLTREND	0.00244300	0.00274540	0.890	0.3741
WKTREND	0.00665262	0.00101088	6.581	0.0000

Equation: 2

Dependent variable: SL

Total cases:	396	Valid cases:	396
Total SS:	1.940	Degrees of freedom:	----
R-squared:	0.051	Rbar-squared:	0.072
Residual SS:	1.842	Std error of est:	2.383
Durbin-Watson:	0.417		

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	0.22099364	0.01432891	15.423	0.0000
WL	-0.44409543	0.12848850	-3.456	0.0006
WK	-0.11374662	0.01424463	-7.985	0.0000
Y1	0.08747791	0.01656923	5.280	0.0000
Y2	-0.08411365	0.01189067	-7.074	0.0000
Y3	0.01718623	0.00399137	4.306	0.0000
Y4	-0.04541453	0.00940262	-4.830	0.0000
TREND	0.00244300	0.00274540	0.890	0.3741

Equation: 3

Dependent variable: SK

Total cases:	396	Valid cases:	396
Total SS:	2.429	Degrees of freedom:	----
R-squared:	0.262	Rbar-squared:	0.279
Residual SS:	1.792	Std error of est:	3.206
Durbin-Watson:	0.347		

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	0.55710267	0.00613199	90.852	0.0000
WL	-0.11374662	0.01424463	-7.985	0.0000
WK	0.17835761	0.01587100	11.238	0.0000
Y1	-0.14735010	0.01885707	-7.814	0.0000
Y2	0.10172310	0.01455194	6.990	0.0000
Y3	0.01064822	0.00455228	2.339	0.0198
Y4	0.05670857	0.01119117	5.067	0.0000
TREND	0.00665262	0.00101088	6.581	0.0000

Equation: 4
Dependent variable: SM

Valid cases: 396
Degrees of freedom: ----

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	0.22190368	0.01462011	15.178	0.0000
WL	0.55784206	0.12999887	4.291	0.0000
WK	-0.06461099	0.01439411	-4.489	0.0000
Y1	0.05987219	0.01596177	3.751	0.0002
Y2	-0.01760945	0.01224916	-1.438	0.1521
Y3	-0.02783444	0.00385982	-7.211	0.0000
Y4	-0.01129404	0.00951559	-1.187	0.2367

MEASURES OF GOODNESS-OF-FIT

AN UNCENTERED SYSTEM R-SQUARE 0.982

A CENTERED SYSTEM R-SQUARE 0.982

The results from the test of the null hypothesis that all slope coefficients in all equations are simultaneously equal to zero.

Test statistic	Prob > t
1595.677	+DEN

VALIDATION OF REGULARITY CONDITIONS

Monotonicity of the Estimated Cost Function

The number of observations for which each of the following predicted cost share is nonpositive is listed below

Labor	Capital	Materials
0 (0.00 %)	0 (0.00 %)	0 (0.00 %)

Concavity of the Estimated Cost Function

The number of the observations for which the condition that the matrix of second order partial derivatives of the cost function with respect to input wages is negative semi-definite holds:

396 (100.00 %)

Quasi-Concavity of the Estimated Cost Function

The number of observations for which the condition that the cost function is strictly quasi-concave in input prices holds:

396 (100.00 %)

Second Order Condition for Cost Minimization

The number of the observations for which the condition that the bordered Hessian is negative definite holds:

396 (100.00 %)

OUT-OF-SAMPLE PREDICTION OF TOTAL COST LEVEL PERFORMANCE LAST 3 YEARS

Actual	Predicted	Difference	t_ratio	p_value	Utility
8.307	8.680	-0.373	-4.468	0.000	East Ohio Gas
9.711	10.078	-0.367	-3.378	0.000	SOUTHERN CALIFORNIA GAS
6.233	6.488	-0.254	-2.916	0.002	Madison Gas & Electric
6.674	6.909	-0.235	-2.641	0.004	North Shore Gas
8.819	9.025	-0.207	-2.189	0.014	NICOR
8.895	9.086	-0.191	-2.192	0.014	Public Service Electric & Gas
7.533	7.710	-0.177	-2.066	0.020	Wisconsin Gas
7.322	7.468	-0.147	-1.693	0.045	Illinois Power
6.802	6.948	-0.146	-1.797	0.036	Louisville Gas and Electric
7.831	7.941	-0.111	-1.294	0.098	BALTIMORE GAS & ELECTRIC CO
7.828	7.932	-0.105	-1.211	0.113	Questar (Mountain Fuel Supply)
7.179	7.258	-0.079	-0.910	0.182	Rochester Gas and Electric
6.599	6.674	-0.075	-0.835	0.202	Wisconsin Power & Light
7.353	7.421	-0.068	-0.794	0.214	People's Natural Gas
8.443	8.510	-0.068	-0.762	0.223	Atlanta Gas Light
7.719	7.748	-0.029	-0.318	0.375	SAN DIEGO GAS & ELECTRIC
7.705	7.727	-0.022	-0.252	0.401	new Jersey Natural Gas
7.711	7.706	0.004	0.049	0.481	Alabama Gas
8.632	8.627	0.004	0.046	0.482	Consolidated Edison
7.200	7.183	0.017	0.204	0.419	COMMONWEALTH GAS
7.888	7.864	0.024	0.274	0.392	Northwest Natural Gas
7.978	7.949	0.029	0.337	0.368	Washington Natural Gas
8.674	8.632	0.043	0.467	0.320	Peoples Gas Light
8.618	8.563	0.054	0.602	0.273	Consumers Power
6.578	6.523	0.055	0.628	0.265	Pg Energy (Penn Gas & Water)
7.096	7.006	0.090	0.978	0.164	Connecticut Energy
6.527	6.434	0.093	1.056	0.146	Orange & Rockland Utilities
7.072	6.964	0.108	1.129	0.130	Connecticut Natural Gas
8.521	8.383	0.138	1.559	0.060	Southwest Gas
7.372	7.203	0.169	1.983	0.024	Public Service of North Carolina
7.028	6.823	0.205	2.167	0.015	Cascade Natural Gas
9.551	9.253	0.298	3.597	0.000	Pacific Gas & Electric
8.123	7.787	0.336	4.037	0.000	Niagra Mohawk
6.084	5.723	0.361	3.766	0.000	Central Hudson Gas
7.791	7.389	0.402	4.573	0.000	Peco (Philadelphia Electric)
8.511	8.100	0.411	5.254	0.000	Washington Gas Light

RTS (sum of output elasticities) calculated at all data points

sum	yn	yvrc	yvoth	ym	utility
0.695	0.825	-0.062	-0.026	-0.042	NICOR
0.707	0.625	0.091	-0.034	0.024	UNION GAS
0.724	0.780	-0.015	-0.027	-0.015	Consumers Power
0.756	0.739	-0.042	-0.020	0.079	ENBRIDGE
0.768	0.622	0.084	-0.020	0.083	East Ohio Gas
0.794	0.769	0.106	-0.027	-0.054	Atlanta Gas Light
0.834	0.743	0.017	-0.024	0.097	Public Service Electric & Gas
0.839	0.355	0.224	-0.022	0.282	Niagra Mohawk
0.843	0.495	0.215	-0.023	0.157	Questar (Mountain Fuel Supply)
0.847	1.085	-0.072	-0.034	-0.133	Pacific Gas & Electric
0.868	0.360	0.298	-0.015	0.225	Washington Natural Gas

0.870	0.323	0.372	-0.021	0.195	Northwest Natural Gas
0.870	0.537	0.136	-0.011	0.209	Washington Gas Light
0.886	0.715	0.195	-0.028	0.004	Southwest Gas
0.888	1.166	-0.080	-0.033	-0.165	SOUTHERN CALIFORNIA GAS
0.889	0.376	0.299	-0.021	0.235	Wisconsin Gas
0.908	0.216	0.367	-0.013	0.338	People's Natural Gas
0.924	0.263	0.385	-0.018	0.293	Illinois Power
0.944	0.301	0.419	-0.021	0.244	Alabama Gas
0.951	0.228	0.451	-0.020	0.292	Public Service of North Carolina
0.957	0.283	0.341	-0.017	0.351	Peco (Philadelphia Electric)
0.961	-0.062	0.603	-0.022	0.443	Cascade Natural Gas
0.983	0.217	0.402	-0.008	0.372	new Jersey Natural Gas
0.986	0.116	0.437	-0.010	0.442	Rochester Gas and Electric
1.004	-0.073	0.511	-0.017	0.584	Pg Energy (Penn Gas & Water)
1.007	-0.076	0.589	-0.014	0.508	Wisconsin Power & Light
1.018	-0.149	0.534	-0.005	0.638	North Shore Gas
1.025	-0.141	0.508	-0.005	0.663	Connecticut Natural Gas
1.047	-0.184	0.599	-0.006	0.639	Madison Gas & Electric
1.047	-0.226	0.596	-0.009	0.687	Orange & Rockland Utilities
1.051	0.062	0.448	-0.011	0.551	COMMONWEALTH GAS
1.052	0.491	0.102	-0.015	0.475	Peoples Gas Light
1.053	0.411	0.300	-0.019	0.361	BALTIMORE GAS & ELECTRIC CO
1.063	0.174	0.439	-0.016	0.466	Louisville Gas and Electric
1.100	-0.087	0.573	-0.010	0.625	Connecticut Energy
1.149	0.538	0.151	-0.015	0.475	Consolidated Edison
1.163	-0.458	0.789	-0.006	0.839	Central Hudson Gas
1.171	0.477	0.401	-0.021	0.314	SAN DIEGO GAS & ELECTRIC

Enbridge #18

INTERROGATORY

Ref: Econometric Cost Model and Productivity Differential

Issue Number:
Issue:

a. Please explain why PEG included Boston Gas, Keyspan Energy Delivery, and Atmos Mid-Tex (TXU) in the sample used to estimate the econometric cost model in its April 2007 testimony "Revised Prepared Direct Testimony of Mark Newton Lowry, Ph.D. on Behalf of Southern California Gas Company" in CPUC Docket No. A.06-12-010 and the accompanying report "TFP Research for Southern California Gas," but did not include these utilities in the sample used to estimate the econometric cost model in the June 20, 2007 report "Rate Adjustment Indexes for Ontario's Natural Gas Utilities."
b. Please provide the data on Boston Gas, Keyspan Energy Delivery, and Atmos Mid-Tex (TXU) that would be necessary to include these companies in the econometric cost model relied upon in the June 20, 2007 report "Rate Adjustment Indexes for Ontario's Natural Gas Utilities."

RESPONSE

a. Boston Gas, Keyspan Energy Delivery, and Atmos Energy Texas were excluded because we believed that a methodology flexible enough to apply to both Union Gas, with its large transmission volume, and to Enbridge should have separate output variables for deliveries to residential and commercial customers and to other customers. Unfortunately, a reliable breakdown of delivery volumes into residential/commercial and other deliveries was not available for these companies.

b. The necessary volume data are not available. All other data for the three companies are provided in the working papers in Section 3.1. Please note that in the recent CPUC testimony the TFP trends of these companies, which reflected a single volume treatment, were -1.85%, 1.66%, and -0.16% respectively.

Witness: Mark Lowry

Enbridge #30

INTERROGATORY

Ref: Econometric Cost Model and Productivity Differential

Issue Number:
Issue:

Please provide the following:

a. The exact source for Canadian multifactor productivity (MFP) or total factor productivity (TFP) growth as described in PEG's study at page 46:

> "As discussed further in Section 3.5 below, we found 1998-2005 to be a sensible input price comparison period when COS capital costing is used. The MFP trend of the Canadian economy was 1.21% during this period."

b. Please provide Canadian MFP levels and growth rates for each available year.

c. Are the Canadian MFP indices based on a GD or COS concept for capital input price measurement?

RESPONSE

a) The Canadian economy MFP series used in PEG's report was the "Multifactor Productivity – Aggregate Business Sector" found in Statistics Canada's Table 383-0016. This table was deleted from CANSIM's tables on July 31, 2007. The figures of Table 383-0021 for the same sector did not become available to replace Table 383-0016 until August 28, 2007. Differences in the series are due to changes in the output specification. One change is that the output of the latter series was constructed by a 'bottom-up' approach of aggregating across business sector industries, while the output of the former was calculated by the 'top-down' approach of starting with GDP figures and making adjustments based upon excluded outputs. Another change is that the original series was valued at market prices, which differ from the 'basic' prices used in the later series by taxes minus subsidies. Input quantity definitions remain the same between series.

Witness: Mark Lowry

b) The series used in PEG's report and the current MFP series are both reproduced in the EGD Q30 Attachment A. Please note that MFP growth is much slower using the new series.

c) They are based on a GD concept.

Economy-Wide Canadian Multifactor Productivity Measures Discussed in Response to Question 30

Year	Previous Series - Canadian Aggregate Business Sector Multifactor Productivity Level[1]	Growth	Current Series - Canadian Aggregate Business Sector Multifactor Productivity Level[2]	Growth
1981	99.2		93.9	
1982	96.5	-2.8%	92.1	-1.9%
1983	98.7	2.3%	93.4	1.4%
1984	102.2	3.5%	96.5	3.3%
1985	103.3	1.1%	97.7	1.2%
1986	101.9	-1.4%	96.3	-1.4%
1987	101.9	0.0%	96.1	-0.2%
1988	101.2	-0.7%	96.3	0.2%
1989	99.9	-1.3%	95.2	-1.1%
1990	97.7	-2.2%	93.4	-1.9%
1991	95	-2.8%	90.9	-2.7%
1992	95.9	0.9%	91.3	0.4%
1993	96.3	0.4%	92.2	1.0%
1994	99	2.8%	94.5	2.5%
1995	99.5	0.5%	94.6	0.1%
1996	98.7	-0.8%	93.7	-1.0%
1997	100	1.3%	94.9	1.3%
1998	101.1	1.1%	95.6	0.7%
1999	103.5	2.3%	97.5	2.0%
2000	106.1	2.5%	99.7	2.2%
2001	106.7	0.6%	99.3	-0.4%
2002	108.9	2.0%	100	0.7%
2003	109	0.1%	99.5	-0.5%
2004	109.5	0.5%	99.1	-0.4%
2005	*NA*		99.3	0.2%
2006	*NA*		99.1	-0.2%

[1] Statistics Canada Table 383-0016, Productivity Measures and Related Variables - National (Annual)

[2] Statistics Canada Table 383-0021, Productivity Measures and Related Variables - National (Annual)

Enbridge #33

INTERROGATORY

Ref: Econometric Cost Model and Productivity Differential

Issue Number:
Issue:

Please provide in-sample and out-of-sample statistical measures as evidence of the U.S. econometric model's ability to predict the costs for each of the sampled U.S. utilities. Specifically, please produce the root mean squared percentage error (RMSPE), the mean percent error (MPE), and the mean absolute percent error (MAPE), measured both in-sample and out-of-sample lagged 1 year for each year for the period 1994-2004 for each of the 36 firms listed in the sample group. Please provide the same measures for the 3 firms not included in the Ontario sample (OEB case EB-2007-0606/0615) but included in the California sample (CPUC Docket No. A.06-12-010). Please provide these measures using each of the following:

a. The March 30, 2007 model presented in Ontario.
b. The April 2007 model presented in California.
c. The June 20, 2007 model presented in Ontario.

RESPONSE

We verify that our econometrical model is correctly specified (i.e., the econometric model is accurate) by examining the statistical significance of the parameter estimates. However, we do not customarily compute the requested statistics and these statistics are not commonly featured in econometric studies. For these reasons, we are not prepared to answer this question.

Witness: Mark Lowry

Enbridge #34

INTERROGATORY

Ref: Econometric Cost Model and Productivity Differential

Issue Number:
Issue:

The June 2007 version of the U.S. model's peer group TFP estimations changed significantly, as the following table demonstrates. The new report details TFP rates that are 0.27% higher, on average. The range of differences in historical growth rates is from -1.21% (Connecticut Energy) to +1.90% (Orange & Rockland), for a total range of difference of 3.11%. Similarly, the new report details scale economies that are -1.05% lower on average. The range of differences in historical scale economies is from -4.26% (Southwest Gas) to +2.07% (Connecticut Natural Gas), for a total range of difference of 6.33%.

Peer Group Candidates	PEG (March 2007)		PEG (June 2007)		TFP Increase / Decrease	Scale Economies Increase / Decrease
	TFP (GD)	Scale Economies (GD)	TFP (GD)	Scale Economies (GD)		
Alabama Gas	-1.9%	0.3%	-2.11%	-0.08%	-0.21%	-0.38%
Atlanta Gas Light	1.1%	1.3%	1.32%	0.19%	0.22%	-1.11%
Baltimore Gas and Electric	0.3%	0.6%	1.29%	0.13%	0.99%	-0.47%
Cascade Natural Gas	3.2%	3.9%	2.70%	-0.08%	-0.50%	-3.98%
Central Hudson Gas & Electric	1.0%	0.6%	2.00%	-0.06%	1.00%	-0.66%
Connecticut Energy	2.4%	2.5%	1.19%	0.05%	-1.21%	-2.45%
Connecticut Natural Gas	-1.6%	-2.1%	0.27%	-0.03%	1.87%	2.07%
Consolidated Edison	0.5%	0.1%	0.87%	0.17%	0.37%	0.07%
Consumers Power	0.2%	1.0%	0.46%	0.10%	0.26%	-0.90%
East Ohio Gas	1.9%	0.7%	2.00%	0.41%	0.10%	-0.29%
Illinois Power	2.2%	0.2%	1.98%	0.15%	-0.22%	-0.05%
Louisville Gas & Electric	0.3%	1.4%	-0.08%	-0.01%	-0.38%	-1.41%

Witness: Mark Lowry

Peer Group Candidates	PEG (March 2007)		PEG (June 2007)		TFP Increase / Decrease	Scale Economies Increase / Decrease
	TFP (GD)	Scale Economies (GD)	TFP (GD)	Scale Economies (GD)		
Madison Gas & Electric	0.8%	2.2%	0.74%	0.02%	-0.06%	-2.18%
Mountain Fuel Supply	1.2%	2.0%	1.89%	0.25%	0.69%	-1.75%
New Jersey Natural	1.5%	2.4%	1.77%	0.19%	0.27%	-2.21%
Niagara Mohawk	0.9%	0.2%	0.98%	0.15%	0.08%	-0.05%
North Shore Gas	1.7%	1.1%	1.97%	0.17%	0.27%	-0.93%
Northern Illinois Gas	0.9%	1.2%	1.18%	0.29%	0.28%	-0.91%
Northwest Natural Gas	1.8%	3.5%	1.94%	0.13%	0.14%	-3.37%
Nstar Gas	1.9%	0.6%	2.54%	0.23%	0.64%	-0.37%
Orange and Rockland	-3.0%	-1.0%	-1.10%	-0.05%	1.90%	0.95%
Pacific Gas & Electric	1.8%	0.8%	2.11%	0.40%	0.31%	-0.40%
PECO	0.5%	1.2%	0.81%	0.09%	0.31%	-1.11%
Peoples Gas Light & Coke	-0.4%	-1.4%	0.14%	0.03%	0.54%	1.43%
People's Natural Gas	0.3%	0.0%	0.30%	0.03%	0.00%	0.03%
PG Energy	1.3%	1.3%	0.91%	0.05%	-0.39%	-1.25%
Public Service Electric & Gas	-0.9%	0.3%	-0.61%	-0.13%	0.29%	-0.43%
Public Service of NC	0.4%	3.3%	0.41%	0.01%	0.01%	-3.29%
Rochester Gas and Electric	0.8%	0.5%	0.79%	0.07%	-0.01%	-0.43%
San Diego Gas & Electric	-0.5%	1.6%	-0.59%	-0.01%	-0.09%	-1.61%
Southern California Gas	1.1%	0.6%	1.52%	0.28%	0.42%	-0.32%
Southwest Gas	2.6%	4.5%	2.63%	0.24%	0.03%	-4.26%
Washingon Natural Gas	0.6%	2.8%	2.08%	0.46%	1.48%	-2.34%
Washington Gas Light	-0.1%	0.6%	0.95%	0.12%	1.05%	-0.48%
Wisconsin Gas	1.6%	1.2%	1.57%	0.16%	-0.03%	-1.04%
Wisconsin Power & Light	1.9%	2.1%	1.22%	0.01%	-0.68%	-2.09%
				Average	**0.27%**	**-1.05%**

a. For each of the firms listed in the table above, please provide all details that caused the change in TFP estimation.
b. For each of the firms listed in the table above, please provide all details that caused the change in estimated scale economies.
c. The TFP projection for Enbridge is calculated as returns to scale plus the rate of technological change. Please calculate for each of the firms in the table above, for both the March and June estimations, the implicit rate of technological change implied by this formula.

RESPONSE

Answers to these questions will be aided by the following preliminary comments.

- As noted in our response to question 20, the output quantity and TFP index trends stated in Tables 8 and 9 of our March report were not our final estimates. In the attached table, labeled "EGD-34 TFP Differences", we report the differences between the original and the final index trends for each company using the March methodology. We also report the TFP trends for the peer groups that result from the new figures. It can be seen that the average trends of the sampled utilities differ little between the original and the revised March results. The average TFP trend for the Enbridge and Union peer groups are unchanged.

- In Enbridge Question 20 the column labeled "Scale Economies" and reproduced from our March report actually contains the growth rates of the elasticity-weighted output quantity indexes. Our reporting of these growth rates on Tables 8 and 9 is consistent with our use of common output elasticities for all sampled companies, as well as the statement on p. 37 of the text that "we, accordingly, selected peer groups for each utility that had similar growth in the elasticity-weighted output index". The column "Scale Economies Increase/Decrease" in question 34 is therefore mislabeled as well and displays an "apples to oranges" comparison that does not warrant discussion.

- In our June 20 report the numbers in the column labeled "Expected Scale Economies" --- which are intended to be estimates of the effects of incremental scale economies on TFP--- are miscalculated. The formula $(1\text{-sum}E_i)$ x growth Y^E that is discussed in footnote 2 was not employed.

Witness: Mark Lowry

We present in the attachments labeled "EGD-34 Table 8 March Revised" and "EGD-34 Table 9 March Revised" tables that contain the final March TFP trends, as well as the average trends for the Enbridge and Union peer groups. We present in the attachments labeled "EGD-34 Table 8 June Revised" and "EGD-34 Table 9 June Revised" tables that contain the correct scale economy effects for Enbridge and Union. We present, finally, in the attachment labeled "EGD-34 Revised Table" a revision to the Enbridge table that contains final "apples to apples" calculations.

With this background we now address the specific Enbridge questions.

a. The chief sources of the generally modest changes in the TFP index trends from the March report to the June report are:
    - changes in the weather-adjusted delivery volumes
    - the use of company-specific elasticity estimates from new econometric models.

b. The differences between the estimates of the scale economy effects using the March and June methods are generally small. The principle sources of the differences are, once again,

    - changes in the weather-adjusted delivery volumes
    - the use of company-specific elasticity estimates from new econometric models.

c. The determinants of TFP growth are discussed in section 2.1.2. of Dr. Lowry's testimony starting on page 6. According to this analysis, the differences between TFP index growth and the scale economy effect reflect an amalgam of circumstances (*e.g.* changes in X-inefficiency and miscellaneous external business conditions) and is not a good estimate of the rate of technological change. We nonetheless provide the requested information in the attached table labeled "EGD-34 Residual".

Q34 Revised Table

Peer Group Candidates	PEG (March 2007) TFP (GD)	PEG (March 2007) Scale Economies (GD)	PEG (June 2007) TFP (GD)	PEG (June 2007) Scale Economies (GD)	TFP Increase / Decrease	Scale Economies Increase / Decrease
Alabama Gas	-1.89%	0.00%	-2.11%	0.00%	-0.23%	0.00%
Atlanta Gas Light	1.09%	0.22%	1.32%	0.23%	0.23%	0.01%
Baltimore Gas and Electric	0.43%	0.13%	1.29%	0.15%	0.86%	0.02%
Cascade Natural Gas	3.26%	-0.07%	2.70%	-0.10%	-0.56%	-0.02%
Central Hudson Gas & Electric	1.06%	-0.04%	2.00%	-0.05%	0.95%	-0.02%
Nstar Gas	1.98%	0.10%	2.54%	0.11%	0.56%	0.01%
Connecticut Energy	2.31%	0.04%	1.19%	0.05%	-1.12%	0.01%
Connecticut Natural Gas	-1.43%	-0.08%	-0.27%	-0.09%	1.16%	-0.01%
Consolidated Edison	0.57%	-0.16%	0.87%	0.08%	0.30%	0.24%
Consumers Power	0.21%	0.38%	0.46%	0.29%	0.26%	-0.09%
East Ohio Gas	1.88%	0.29%	2.00%	0.16%	0.11%	-0.13%
Illinois Power	2.22%	-0.01%	1.98%	0.00%	-0.24%	0.00%
Niagara Mohawk	0.97%	-0.02%	0.98%	0.04%	0.01%	0.06%
North Shore Gas	1.72%	0.14%	1.97%	0.12%	0.26%	-0.02%
Northern Illinois Gas	0.96%	0.51%	1.18%	0.36%	0.22%	-0.15%
Northwest Natural Gas	1.88%	0.15%	1.94%	0.23%	0.06%	0.08%
Orange and Rockland	-2.89%	-0.09%	-1.10%	0.04%	1.80%	0.13%
Pacific Gas & Electric	1.82%	0.22%	2.11%	0.21%	0.28%	-0.01%
PECO	0.55%	0.15%	0.81%	0.16%	0.27%	0.01%
Peoples Gas Light & Coke	-0.35%	-0.20%	0.14%	-0.20%	0.48%	0.00%
People's Natural Gas	0.32%	0.02%	0.30%	0.00%	-0.02%	-0.02%
PG Energy	1.25%	0.07%	0.91%	0.05%	-0.34%	-0.02%
Public Service Electric & Gas	-0.82%	0.07%	-0.61%	0.13%	0.20%	0.06%
Public Service of NC	0.46%	-0.01%	0.41%	0.10%	-0.05%	0.11%
Rochester Gas and Electric	0.76%	0.06%	0.79%	0.05%	0.03%	0.00%
San Diego Gas & Electric	-0.52%	-0.09%	-0.59%	0.03%	-0.06%	0.12%
Southern California Gas	1.15%	0.17%	1.52%	0.17%	0.36%	0.00%
Southwest Gas	2.56%	0.23%	2.63%	0.42%	0.07%	0.19%
Washington Gas Light	0.11%	1.46%	2.08%	0.60%	1.98%	-0.86%
Washington Natural Gas	0.66%	0.44%	0.95%	0.40%	0.29%	-0.04%
Wisconsin Gas	1.59%	0.11%	1.57%	0.12%	-0.02%	0.01%
Wisconsin Power & Light	1.88%	-0.02%	1.22%	0.01%	-0.67%	0.03%
Mountain Fuel Supply	1.31%	0.35%	1.89%	0.36%	0.57%	0.00%
New Jersey Natural	1.53%	0.27%	1.77%	0.29%	0.25%	0.02%
Louisville Gas & Electric	0.30%	0.05%	-0.08%	0.06%	-0.39%	0.02%
Madison Gas & Electric	0.79%	0.09%	0.74%	0.07%	-0.05%	-0.01%
Average	0.82%	0.14%	1.04%	0.13%	0.22%	-0.01%

Table 8 (March Revised)

CHOOSING TFP PEERS FOR ENBRIDGE

Company	TFP	Output Quantity Growth		Peer
		Company	vs. Enbridge	
Arithmetic Sample Average [fn]	0.82%	1.21%	-1.36%	
Peer Average	**1.35%**	**2.61%**	**0.04%**	
Enbridge	1.03%	2.57%		
Southwest Gas	**2.6%**	4.5%	1.9%	
Cascade Natural Gas	**3.3%**	4.0%	1.4%	
Northwest Natural Gas	**1.9%**	3.5%	1.0%	1
Public Service of NC	**0.5%**	3.3%	0.7%	1
Washington Natural Gas	**0.7%**	2.8%	0.3%	1
New Jersey Natural	**1.5%**	2.5%	-0.1%	1
Connecticut Energy	**2.3%**	2.4%	-0.2%	1
Madison Gas & Electric	**0.8%**	2.2%	-0.4%	1
Wisconsin Power & Light	**1.9%**	2.1%	-0.5%	1
Mountain Fuel Supply	**1.3%**	2.1%	-0.5%	1
San Diego Gas & Electric	**-0.5%**	1.6%	-0.9%	
Louisville Gas & Electric	**0.3%**	1.4%	-1.2%	
Atlanta Gas Light	**1.1%**	1.3%	-1.2%	
PG Energy	**1.2%**	1.3%	-1.2%	
Wisconsin Gas	**1.6%**	1.2%	-1.3%	
Northern Illinois Gas	**1.0%**	1.2%	-1.3%	
PECO	**0.5%**	1.2%	-1.3%	
North Shore Gas	**1.7%**	1.1%	-1.4%	
Consumers Power	**0.2%**	1.1%	-1.5%	
Pacific Gas & Electric	**1.8%**	0.8%	-1.8%	
Washington Gas Light	**0.1%**	0.8%	-1.8%	
Central Hudson Gas & Electric	**1.1%**	0.7%	-1.9%	
East Ohio Gas	**1.9%**	0.7%	-1.9%	
Nstar Gas	**2.0%**	0.7%	-1.9%	
Baltimore Gas and Electric	**0.4%**	0.6%	-1.9%	
Southern California Gas	**1.2%**	0.6%	-2.0%	
Rochester Gas and Electric	**0.8%**	0.5%	-2.0%	
Public Service Electric & Gas	**-0.8%**	0.4%	-2.2%	
Alabama Gas	**-1.9%**	0.3%	-2.3%	
Niagara Mohawk	**1.0%**	0.2%	-2.3%	
Illinois Power	**2.2%**	0.2%	-2.4%	
Consolidated Edison	**0.6%**	0.1%	-2.5%	
People's Natural Gas	**0.3%**	0.0%	-2.5%	
Orange and Rockland	**-2.9%**	-0.9%	-3.4%	
Peoples Gas Light & Coke	**-0.3%**	-1.3%	-3.9%	
Connecticut Natural Gas	**-1.4%**	-2.0%	-4.6%	

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

Table 9 (March Revised)

CHOOSING TFP PEERS FOR UNION

Company	TFP	Output Quantity Growth		Peer
		Company	vs. Union	
Arithmetic Sample Average [fn]	0.82%	1.21%	-0.57%	
Peer Average	**1.05%**	**1.82%**	**0.04%**	
Union	1.98%	1.78%		
Southwest Gas	**2.6%**	4.5%	2.7%	
Cascade Natural Gas	**3.3%**	4.0%	2.2%	
Northwest Natural Gas	**1.9%**	3.5%	1.8%	
Public Service of NC	**0.5%**	3.3%	1.5%	
Washington Natural Gas	**0.7%**	2.8%	1.1%	
New Jersey Natural	**1.5%**	2.5%	0.7%	
Connecticut Energy	**2.3%**	2.4%	0.6%	1
Madison Gas & Electric	**0.8%**	2.2%	0.4%	1
Wisconsin Power & Light	**1.9%**	2.1%	0.3%	1
Mountain Fuel Supply	**1.3%**	2.1%	0.3%	1
San Diego Gas & Electric	**-0.5%**	1.6%	-0.2%	1
Louisville Gas & Electric	**0.3%**	1.4%	-0.4%	1
Atlanta Gas Light	**1.1%**	1.3%	-0.5%	1
PG Energy	**1.2%**	1.3%	-0.5%	1
Wisconsin Gas	**1.6%**	1.2%	-0.5%	
Northern Illinois Gas	**1.0%**	1.2%	-0.5%	
PECO	**0.5%**	1.2%	-0.6%	
North Shore Gas	**1.7%**	1.1%	-0.6%	
Consumers Power	**0.2%**	1.1%	-0.7%	
Pacific Gas & Electric	**1.8%**	0.8%	-1.0%	
Washington Gas Light	**0.1%**	0.8%	-1.0%	
Central Hudson Gas & Electric	**1.1%**	0.7%	-1.1%	
East Ohio Gas	**1.9%**	0.7%	-1.1%	
Nstar Gas	**2.0%**	0.7%	-1.1%	
Baltimore Gas and Electric	**0.4%**	0.6%	-1.1%	
Southern California Gas	**1.2%**	0.6%	-1.2%	
Rochester Gas and Electric	**0.8%**	0.5%	-1.2%	
Public Service Electric & Gas	**-0.8%**	0.4%	-1.4%	
Alabama Gas	**-1.9%**	0.3%	-1.5%	
Niagara Mohawk	**1.0%**	0.2%	-1.5%	
Illinois Power	**2.2%**	0.2%	-1.6%	
Consolidated Edison	**0.6%**	0.1%	-1.7%	
People's Natural Gas	**0.3%**	0.0%	-1.7%	
Orange and Rockland	**-2.9%**	-0.9%	-2.6%	
Peoples Gas Light & Coke	**-0.3%**	-1.3%	-3.1%	
Connecticut Natural Gas	**-1.4%**	-2.0%	-3.8%	

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

Table 8a (June Revised)

CHOOSING TFP PEERS FOR ENBRIDGE: GEOMETRIC DECAY

Company	TFP	Expected Scale Economies		Peer
		Company	vs. Enbridge	
Arithmetic Sample Average [fn]	1.04%	0.13%	-0.50%	
Peer Average	**1.61%**	**0.37%**	**-0.26%**	
Enbridge	0.83%	0.63%		
Washington Gas Light	**2.1%**	0.60%	0.0%	1
Southwest Gas	**2.6%**	0.42%	-0.2%	1
Washington Natural Gas	**0.9%**	0.40%	-0.2%	1
Northern Illinois Gas	**1.2%**	0.36%	-0.3%	1
Mountain Fuel Supply	**1.9%**	0.36%	-0.3%	1
Consumers Power	**0.5%**	0.29%	-0.3%	1
New Jersey Natural	**1.8%**	0.29%	-0.3%	1
Northwest Natural Gas	**1.9%**	0.23%	-0.4%	1
Atlanta Gas Light	**1.3%**	0.23%	-0.4%	
Pacific Gas & Electric	**2.1%**	0.21%	-0.4%	
Southern California Gas	**1.5%**	0.17%	-0.5%	
East Ohio Gas	**2.0%**	0.16%	-0.5%	
PECO	**0.8%**	0.16%	-0.5%	
Baltimore Gas and Electric	**1.3%**	0.15%	-0.5%	
Public Service Electric & Gas	**-0.6%**	0.13%	-0.5%	
Wisconsin Gas	**1.6%**	0.12%	-0.5%	
North Shore Gas	**2.0%**	0.12%	-0.5%	
Nstar Gas	**2.5%**	0.11%	-0.5%	
Public Service of NC	**0.4%**	0.10%	-0.5%	
Consolidated Edison	**0.9%**	0.08%	-0.5%	
Madison Gas & Electric	**0.7%**	0.07%	-0.6%	
Louisville Gas & Electric	**-0.1%**	0.06%	-0.6%	
Rochester Gas and Electric	**0.8%**	0.05%	-0.6%	
Connecticut Energy	**1.2%**	0.05%	-0.6%	
PG Energy	**0.9%**	0.05%	-0.6%	
Orange and Rockland	**-1.1%**	0.04%	-0.6%	
Niagara Mohawk	**1.0%**	0.04%	-0.6%	
San Diego Gas & Electric	**-0.6%**	0.03%	-0.6%	
Wisconsin Power & Light	**1.2%**	0.01%	-0.6%	
Alabama Gas	**-2.1%**	0.00%	-0.6%	
People's Natural Gas	**0.3%**	0.00%	-0.6%	
Illinois Power	**2.0%**	0.00%	-0.6%	
Central Hudson Gas & Electric	**2.0%**	-0.05%	-0.7%	
Connecticut Natural Gas	**-0.3%**	-0.09%	-0.7%	
Cascade Natural Gas	**2.7%**	-0.10%	-0.7%	
Peoples Gas Light & Coke	**0.1%**	-0.20%	-0.8%	

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

Table 8b (June Revised)

CHOOSING TFP PEERS FOR ENBRIDGE: COS

Company	TFP	Expected Scale Economies: Company	Expected Scale Economies: vs. Union	Peer
Arithmetic Sample Average [fn]	1.29%	0.14%	-0.51%	
Peer Average	**1.83%**	**0.38%**	**-0.27%**	
Enbridge	0.71%	0.65%		
Washington Gas Light	**2.6%**	0.69%	0.04%	1
Washington Natural Gas	**1.0%**	0.44%	-0.21%	1
Southwest Gas	**2.9%**	0.39%	-0.26%	1
Northern Illinois Gas	**1.6%**	0.39%	-0.26%	1
Mountain Fuel Supply	**2.2%**	0.37%	-0.28%	1
New Jersey Natural	**1.8%**	0.33%	-0.32%	1
Consumers Power	**0.8%**	0.31%	-0.34%	1
Northwest Natural Gas	**2.1%**	0.24%	-0.41%	1
Atlanta Gas Light	**1.5%**	0.23%	-0.42%	1
Pacific Gas & Electric	**2.3%**	0.22%	-0.43%	
East Ohio Gas	**2.4%**	0.20%	-0.45%	
Southern California Gas	**1.7%**	0.19%	-0.46%	
PECO	**1.2%**	0.17%	-0.48%	
Baltimore Gas and Electric	**2.0%**	0.16%	-0.49%	
Public Service Electric & Gas	**-0.5%**	0.15%	-0.50%	
North Shore Gas	**2.2%**	0.14%	-0.51%	
Wisconsin Gas	**1.8%**	0.13%	-0.52%	
Nstar Gas	**2.6%**	0.13%	-0.52%	
Public Service of NC	**0.4%**	0.10%	-0.55%	
Louisville Gas & Electric	**0.3%**	0.07%	-0.58%	
Madison Gas & Electric	**1.0%**	0.07%	-0.58%	
Orange and Rockland	**-0.9%**	0.07%	-0.58%	
Niagara Mohawk	**1.6%**	0.06%	-0.59%	
Rochester Gas and Electric	**0.9%**	0.06%	-0.59%	
PG Energy	**1.1%**	0.06%	-0.59%	
Connecticut Energy	**1.3%**	0.05%	-0.60%	
Consolidated Edison	**0.9%**	0.04%	-0.61%	
San Diego Gas & Electric	**-0.5%**	0.02%	-0.63%	
Wisconsin Power & Light	**1.4%**	0.02%	-0.63%	
People's Natural Gas	**0.7%**	0.01%	-0.64%	
Alabama Gas	**-2.1%**	0.01%	-0.64%	
Illinois Power	**2.4%**	0.00%	-0.65%	
Central Hudson Gas & Electric	**2.1%**	-0.04%	-0.69%	
Connecticut Natural Gas	**0.2%**	-0.07%	-0.72%	
Cascade Natural Gas	**2.9%**	-0.09%	-0.74%	
Peoples Gas Light & Coke	**0.6%**	-0.17%	-0.82%	

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

Table 9a (June Revised)

CHOOSING TFP PEERS FOR UNION: GEOMETRIC DECAY

Company	TFP	Expected Scale Economies		Peer
		Company	vs. Enbridge	
Arithmetic Sample Average [fn]	1.04%	0.13%	-0.14%	
Peer Average	**1.52%**	**0.27%**	**0.00%**	
Union	1.76%	0.27%		
Washington Gas Light	**2.08%**	0.60%	0.3%	
Southwest Gas	**2.63%**	0.42%	0.2%	
Washington Natural Gas	**0.9%**	0.40%	0.1%	
Northern Illinois Gas	**1.2%**	0.36%	0.1%	1
Mountain Fuel Supply	**1.9%**	0.36%	0.1%	1
Consumers Power	**0.5%**	0.29%	0.0%	1
New Jersey Natural	**1.8%**	0.29%	0.0%	1
Northwest Natural Gas	**1.9%**	0.23%	0.0%	1
Atlanta Gas Light	**1.3%**	0.23%	0.0%	1
Pacific Gas & Electric	**2.1%**	0.21%	-0.1%	1
Southern California Gas	**1.5%**	0.17%	-0.1%	1
East Ohio Gas	**2.0%**	0.16%	-0.1%	
PECO	**0.8%**	0.16%	-0.1%	
Baltimore Gas and Electric	**1.3%**	0.15%	-0.1%	
Public Service Electric & Gas	**-0.6%**	0.13%	-0.1%	
Wisconsin Gas	**1.6%**	0.12%	-0.1%	
North Shore Gas	**2.0%**	0.12%	-0.2%	
Nstar Gas	**2.5%**	0.11%	-0.2%	
Public Service of NC	**0.4%**	0.10%	-0.2%	
Consolidated Edison	**0.9%**	0.08%	-0.2%	
Madison Gas & Electric	**0.7%**	0.07%	-0.2%	
Louisville Gas & Electric	**-0.1%**	0.06%	-0.2%	
Rochester Gas and Electric	**0.8%**	0.05%	-0.2%	
Connecticut Energy	**1.2%**	0.05%	-0.2%	
PG Energy	**0.9%**	0.05%	-0.2%	
Orange and Rockland	**-1.1%**	0.04%	-0.2%	
Niagara Mohawk	**1.0%**	0.04%	-0.2%	
San Diego Gas & Electric	**-0.6%**	0.03%	-0.2%	
Wisconsin Power & Light	**1.2%**	0.01%	-0.3%	
Alabama Gas	**-2.1%**	0.00%	-0.3%	
People's Natural Gas	**0.3%**	0.00%	-0.3%	
Illinois Power	**2.0%**	0.00%	-0.3%	
Central Hudson Gas & Electric	**2.0%**	-0.05%	-0.3%	
Connecticut Natural Gas	**-0.3%**	-0.09%	-0.4%	
Cascade Natural Gas	**2.7%**	-0.10%	-0.4%	
Peoples Gas Light & Coke	**0.1%**	-0.20%	-0.5%	

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

Table 9b (June Revised)

CHOOSING TFP PEERS FOR UNION: COS

Company	TFP	Expected Scale Economies Company	Expected Scale Economies vs. Union	Peer
Arithmetic Sample Average [fn]	1.29%	0.14%	-0.13%	
Peer Average	**1.82%**	**0.28%**	**0.00%**	
Union	1.87%	0.28%		
Washington Gas Light	**2.61%**	0.69%	0.42%	
Washington Natural Gas	**1.04%**	0.44%	0.16%	
Southwest Gas	**2.90%**	0.39%	0.11%	
Northern Illinois Gas	**1.58%**	0.39%	0.11%	1
Mountain Fuel Supply	**2.16%**	0.37%	0.09%	1
New Jersey Natural	**1.83%**	0.33%	0.05%	1
Consumers Power	**0.82%**	0.31%	0.04%	1
Northwest Natural Gas	**2.09%**	0.24%	-0.03%	1
Atlanta Gas Light	**1.45%**	0.23%	-0.05%	1
Pacific Gas & Electric	**2.27%**	0.22%	-0.05%	1
East Ohio Gas	**2.44%**	0.20%	-0.08%	1
Southern California Gas	**1.74%**	0.19%	-0.09%	1
PECO	**1.19%**	0.17%	-0.10%	
Baltimore Gas and Electric	**1.95%**	0.16%	-0.12%	
Public Service Electric & Gas	**-0.51%**	0.15%	-0.13%	
North Shore Gas	**2.21%**	0.14%	-0.14%	
Wisconsin Gas	**1.80%**	0.13%	-0.15%	
Nstar Gas	**2.62%**	0.13%	-0.15%	
Public Service of NC	**0.41%**	0.10%	-0.18%	
Louisville Gas & Electric	**0.27%**	0.07%	-0.20%	
Madison Gas & Electric	**0.98%**	0.07%	-0.20%	
Orange and Rockland	**-0.93%**	0.07%	-0.21%	
Niagara Mohawk	**1.62%**	0.06%	-0.21%	
Rochester Gas and Electric	**0.94%**	0.06%	-0.21%	
PG Energy	**1.15%**	0.06%	-0.22%	
Connecticut Energy	**1.27%**	0.05%	-0.22%	
Consolidated Edison	**0.86%**	0.04%	-0.24%	
San Diego Gas & Electric	**-0.47%**	0.02%	-0.25%	
Wisconsin Power & Light	**1.40%**	0.02%	-0.26%	
People's Natural Gas	**0.69%**	0.01%	-0.27%	
Alabama Gas	**-2.09%**	0.01%	-0.27%	
Illinois Power	**2.44%**	0.00%	-0.27%	
Central Hudson Gas & Electric	**2.06%**	-0.04%	-0.31%	
Connecticut Natural Gas	**0.18%**	-0.07%	-0.35%	
Cascade Natural Gas	**2.95%**	-0.09%	-0.37%	
Peoples Gas Light & Coke	**0.63%**	-0.17%	-0.45%	

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

DIFFERENCE BETWEEN THE TFP INDEX TRENDS AND SCALE ECONOMY EFFECTS BY COMPANY

	Cost of Service (June)			Geometric Decay (June)			Geometric Decay (March)		
	TFP Index Trend	Scale Economy Effects	Difference	TFP Index Trend	Scale Economy Effects	Difference	TFP Index Trend	Scale Economy Effects	Difference
Alabama Gas	-2.09%	0.01%	-2.10%	-2.11%	0.00%	-2.12%	-1.89%	0.00%	-1.89%
Atlanta Gas Light	1.45%	0.23%	1.22%	1.32%	0.23%	1.09%	1.09%	0.22%	0.87%
Baltimore Gas and Electric	1.95%	0.16%	1.79%	1.29%	0.15%	1.13%	0.43%	0.13%	0.30%
Cascade Natural Gas	2.95%	-0.09%	3.04%	2.70%	-0.10%	2.80%	3.26%	-0.07%	3.34%
Central Hudson Gas & Electric	2.06%	-0.03%	2.09%	2.00%	-0.05%	2.05%	1.06%	-0.04%	1.09%
Nstar Gas	2.62%	0.13%	2.50%	2.54%	0.11%	2.43%	1.98%	0.10%	1.88%
Southern CT Gas	1.27%	0.12%	1.16%	1.18%	0.05%	1.14%	2.31%	0.04%	2.27%
Connecticut Natural Gas	0.18%	-0.03%	0.21%	-0.27%	-0.09%	-0.18%	-1.43%	-0.08%	-1.35%
Consolidated Edison	0.86%	0.04%	0.82%	0.87%	0.08%	0.79%	0.57%	-0.16%	0.73%
Consumers Power	0.82%	0.31%	0.51%	0.46%	0.29%	0.17%	0.21%	0.38%	-0.17%
East Ohio Gas	2.44%	0.20%	2.25%	2.00%	0.16%	1.83%	1.88%	0.29%	1.59%
Illinois Power	2.44%	0.00%	2.44%	1.98%	0.00%	1.98%	2.22%	-0.01%	2.22%
Niagara Mohawk	1.62%	0.06%	1.56%	0.98%	0.04%	0.94%	0.97%	-0.02%	0.99%
North Shore Gas	2.21%	0.15%	2.06%	1.97%	0.12%	1.85%	1.72%	0.14%	1.58%
Nicor	1.58%	0.39%	1.19%	1.18%	0.36%	0.82%	0.96%	0.51%	0.46%
Northwest Natural Gas	2.09%	0.24%	1.85%	1.94%	0.23%	1.71%	1.88%	0.15%	1.73%
Orange and Rockland	-0.93%	0.07%	-1.01%	-1.10%	0.04%	-1.14%	-2.89%	-0.09%	-2.80%
Pacific Gas & Electric	2.27%	0.22%	2.05%	2.11%	0.21%	1.90%	1.82%	0.22%	1.61%
PECO	1.19%	0.17%	1.01%	0.81%	0.16%	0.66%	0.55%	0.15%	0.40%
Peoples Gas Light & Coke	0.63%	-0.17%	0.80%	0.14%	-0.20%	0.34%	-0.35%	-0.20%	-0.15%
People's Natural Gas	0.69%	0.01%	0.68%	0.30%	0.00%	0.30%	0.32%	0.02%	0.30%
Pg Energy	1.14%	0.06%	1.09%	0.90%	0.05%	0.86%	1.25%	0.07%	1.18%
PSEG	-0.51%	0.15%	-0.66%	-0.61%	0.13%	-0.75%	-0.82%	0.07%	-0.89%
Public Service of NC	0.41%	0.10%	0.32%	0.41%	0.10%	0.31%	0.46%	-0.01%	0.47%
Rochester Gas and Electric	0.94%	0.06%	0.88%	0.79%	0.05%	0.74%	0.76%	0.06%	0.70%
San Diego Gas & Electric	-0.47%	0.02%	-0.49%	-0.59%	0.03%	-0.62%	-0.52%	-0.09%	-0.43%
Southern California Gas	1.74%	0.19%	1.55%	1.52%	0.17%	1.34%	1.15%	0.17%	0.98%
Southwest Gas	2.90%	0.39%	2.51%	2.63%	0.42%	2.21%	2.56%	0.23%	2.33%
Washington Gas Light	2.61%	0.70%	1.91%	2.08%	0.60%	1.48%	0.11%	1.46%	-1.36%
Puget Sound Energy	1.04%	0.44%	0.60%	0.95%	0.40%	0.55%	0.65%	0.44%	0.21%
Wisconsin Gas	1.80%	0.13%	1.67%	1.57%	0.12%	1.44%	1.59%	0.11%	1.47%
Wisconsin Power & Light	1.40%	0.02%	1.38%	1.22%	0.01%	1.21%	1.88%	-0.02%	1.90%
Questar	2.16%	0.37%	1.79%	1.89%	0.36%	1.53%	1.31%	0.35%	0.96%
New Jersey Natural	1.83%	0.33%	1.51%	1.77%	0.29%	1.49%	1.53%	0.27%	1.26%
LGE	0.27%	0.07%	0.20%	-0.08%	0.06%	-0.15%	0.30%	0.05%	0.26%
MG&E	0.97%	0.14%	0.83%	0.74%	0.10%	0.63%	0.79%	0.09%	0.71%
Average	1.29%	0.15%	1.14%	1.04%	0.13%	0.91%	0.82%	0.14%	0.69%

Difference Between Original and Revised March TFP Results

Company	TFP (Original)	TFP (Revised)	Difference
Arithmetic Sample Average [fn]	**0.79%**	**0.82%**	**0.03%**
Enbridge	**1.03%**	**1.03%**	**0.00%**
Union	**1.98%**	**1.98%**	**0.00%**
Alabama Gas	-1.89%	-1.89%	0.00%
Atlanta Gas Light	1.05%	1.09%	0.03%
Baltimore Gas and Electric	0.35%	0.43%	0.08%
Cascade Natural Gas	3.24%	3.26%	0.02%
Central Hudson Gas & Electric	0.99%	1.06%	0.07%
Nstar Gas	1.95%	1.98%	0.03%
Connecticut Energy	2.40%	2.31%	-0.09%
Connecticut Natural Gas	-1.59%	-1.43%	0.15%
Consolidated Edison	0.52%	0.57%	0.05%
Consumers Power	0.18%	0.21%	0.03%
East Ohio Gas	1.87%	1.88%	0.01%
Illinois Power	2.21%	2.22%	0.00%
Niagara Mohawk	0.94%	0.97%	0.03%
North Shore Gas	1.68%	1.72%	0.04%
Northern Illinois Gas	0.95%	0.96%	0.02%
Northwest Natural Gas	1.84%	1.88%	0.04%
Orange and Rockland	-3.05%	-2.89%	0.16%
Pacific Gas & Electric	1.82%	1.82%	0.01%
PECO	0.51%	0.55%	0.04%
Peoples Gas Light & Coke	-0.42%	-0.35%	0.07%
People's Natural Gas	0.31%	0.32%	0.01%
PG Energy	1.26%	1.25%	-0.01%
Public Service Electric & Gas	-0.87%	-0.82%	0.06%
Public Service of NC	0.44%	0.46%	0.02%
Rochester Gas and Electric	0.75%	0.76%	0.01%
San Diego Gas & Electric	-0.52%	-0.52%	0.00%
Southern California Gas	1.14%	1.15%	0.01%
Southwest Gas	2.55%	2.56%	0.01%
Washington Gas Light	-0.06%	0.11%	0.17%
Washington Natural Gas	0.60%	0.66%	0.05%
Wisconsin Gas	1.58%	1.59%	0.01%
Wisconsin Power & Light	1.91%	1.88%	-0.03%
Mountain Fuel Supply	1.25%	1.31%	0.07%
New Jersey Natural	1.50%	1.53%	0.03%
Louisville Gas & Electric	0.30%	0.30%	0.00%
Madison Gas & Electric	0.76%	0.79%	0.03%

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

Enbridge #35

INTERROGATORY

Ref: Econometric Cost Model and Productivity Differential

Issue Number:
Issue:

On p. 46 PEG states,

> "It is noteworthy that the target for Enbridge is well above its recent historical trend. One theory that fits these facts is that the frequent rate cases of Enbridge produced unusually weak performance incentives."

Please produce the historical trends for each of the sample U.S. firms (including the 3 missing from the sample used in Ontario relative to those used in CPUC Docket No. A.06-12-010). Please comment on any "unusually weak performance incentives" for each U.S. utility whose TFP estimate is above its historical trend for the 1994-2004 period.

RESPONSE

The attachment labeled "EGD-35 Attachment" provides the requested information for the GD and COS approaches to capital costing using common and company specific rates of technological change. Analogous results for the three missing companies cannot be computed for the reasons explained in our response to Question 18. Inspecting the table, it can be seen that many companies had TFP index trends that were considerably slower than the corresponding TFP projections. We do not know enough about the individual circumstances of these companies to make generalizations. It is notable, however, that the worst performing company, Alabama Gas, operates under a revenue stabilization mechanism that we believe to have poor incentive properties.

Witness: Mark Lowry

COMPARISON OF TFP PROJECTIONS AND INDEX TRENDS:
COS CAPITAL COSTING AND COMMON TECHNOLOGICAL CHANGE

Company	TFP Index Trend [A]	Econometric TFP Projection [B]	Difference [A]-[B]
Alabama Gas	-2.09%	1.45%	-3.55%
Orange and Rockland	-0.93%	1.52%	-2.45%
PSEG	-0.51%	1.59%	-2.10%
San Diego Gas & Electric	-0.47%	1.47%	-1.94%
LGE	0.27%	1.52%	-1.25%
Connecticut Natural Gas	0.18%	1.41%	-1.23%
Public Service of NC	0.41%	1.54%	-1.13%
Consumers Power	0.82%	1.76%	-0.94%
Puget Sound Energy	1.04%	1.88%	-0.85%
People's Natural Gas	0.69%	1.45%	-0.77%
Peoples Gas Light & Coke	0.63%	1.27%	-0.64%
Consolidated Edison	0.86%	1.48%	-0.62%
MG&E	0.97%	1.59%	-0.61%
Rochester Gas and Electric	0.94%	1.51%	-0.57%
PECO	1.19%	1.62%	-0.43%
Pg Energy	1.14%	1.50%	-0.36%
Southern CT Gas	1.27%	1.56%	-0.29%
Nicor	1.58%	1.84%	-0.26%
Atlanta Gas Light	1.45%	1.67%	-0.22%
Wisconsin Power & Light	1.40%	1.46%	-0.07%
New Jersey Natural	1.83%	1.77%	0.06%
Southern California Gas	1.74%	1.64%	0.10%
Niagara Mohawk	1.62%	1.51%	0.11%
Wisconsin Gas	1.80%	1.58%	0.23%
Baltimore Gas and Electric	1.95%	1.61%	0.35%
Questar	2.16%	1.81%	0.35%
Northwest Natural Gas	2.09%	1.69%	0.40%
Washington Gas Light	2.61%	2.15%	0.46%
Pacific Gas & Electric	2.27%	1.67%	0.60%
North Shore Gas	2.21%	1.60%	0.61%
Central Hudson Gas & Electric	2.06%	1.42%	0.65%
East Ohio Gas	2.44%	1.64%	0.80%
Illinois Power	2.44%	1.45%	0.99%
Nstar Gas	2.62%	1.57%	1.05%
Southwest Gas	2.90%	1.84%	1.06%
Cascade Natural Gas	2.95%	1.35%	1.60%
Average	**1.29%**	**1.59%**	**-0.30%**

COMPARISON OF TFP PROJECTIONS AND INDEX TRENDS:
COS CAPITAL COSTING AND COMPANY SPECIFIC TECHNOLOGICAL CHANGE

Company	TFP Index Trend [A]	Econometric TFP Projection [B]	Difference [A]-[B]
Alabama Gas	-2.09%	1.44%	-3.54%
Orange and Rockland	-0.93%	1.41%	-2.34%
PSEG	-0.51%	1.51%	-2.02%
San Diego Gas & Electric	-0.47%	1.46%	-1.93%
LGE	0.27%	1.70%	-1.43%
Public Service of NC	0.41%	1.74%	-1.33%
Connecticut Natural Gas	0.18%	1.32%	-1.14%
Consumers Power	0.82%	1.89%	-1.07%
People's Natural Gas	0.69%	1.52%	-0.84%
Puget Sound Energy	1.04%	1.84%	-0.80%
MG&E	0.97%	1.74%	-0.77%
Pg Energy	1.14%	1.69%	-0.55%
Rochester Gas and Electric	0.94%	1.47%	-0.53%
PECO	1.19%	1.69%	-0.50%
Peoples Gas Light & Coke	0.63%	1.12%	-0.49%
Atlanta Gas Light	1.45%	1.86%	-0.41%
Consolidated Edison	0.86%	1.18%	-0.31%
Southern CT Gas	1.27%	1.54%	-0.27%
Nicor	1.58%	1.81%	-0.24%
Wisconsin Power & Light	1.40%	1.57%	-0.17%
Questar	2.16%	2.10%	0.06%
Southern California Gas	1.74%	1.61%	0.12%
Niagara Mohawk	1.62%	1.49%	0.13%
Wisconsin Gas	1.80%	1.67%	0.14%
New Jersey Natural	1.83%	1.62%	0.22%
Baltimore Gas and Electric	1.95%	1.70%	0.25%
Northwest Natural Gas	2.09%	1.70%	0.39%
Washington Gas Light	2.61%	2.19%	0.42%
Pacific Gas & Electric	2.27%	1.73%	0.54%
North Shore Gas	2.21%	1.46%	0.75%
Central Hudson Gas & Electric	2.06%	1.25%	0.81%
Southwest Gas	2.90%	2.08%	0.82%
Illinois Power	2.44%	1.52%	0.92%
East Ohio Gas	2.44%	1.48%	0.96%
Nstar Gas	2.62%	1.56%	1.06%
Cascade Natural Gas	2.95%	1.28%	1.67%
Average	**1.29%**	**1.61%**	**-0.32%**

COMPARISON OF TFP PROJECTIONS AND INDEX TRENDS:
GD CAPITAL COSTING AND COMPANY SPECIFIC TECHNOLOGICAL CHANGE

Company	TFP Index Trend [A]	Econometric TFP Projection [B]	Difference [A]-[B]
Alabama Gas	-2.11%	1.44%	-3.56%
Orange and Rockland	-1.10%	1.41%	-2.50%
PSEG	-0.61%	1.51%	-2.12%
San Diego Gas & Electric	-0.59%	1.46%	-2.05%
LGE	-0.08%	1.70%	-1.78%
Connecticut Natural Gas	-0.27%	1.32%	-1.59%
Consumers Power	0.46%	1.89%	-1.43%
Public Service of NC	0.41%	1.74%	-1.33%
People's Natural Gas	0.30%	1.52%	-1.22%
MG&E	0.74%	1.74%	-1.01%
Peoples Gas Light & Coke	0.14%	1.12%	-0.98%
Puget Sound Energy	0.95%	1.84%	-0.89%
PECO	0.81%	1.69%	-0.87%
Pg Energy	0.90%	1.69%	-0.79%
Rochester Gas and Electric	0.79%	1.47%	-0.68%
Nicor	1.18%	1.81%	-0.63%
Atlanta Gas Light	1.32%	1.86%	-0.54%
Niagara Mohawk	0.98%	1.49%	-0.51%
Baltimore Gas and Electric	1.29%	1.70%	-0.42%
Southern CT Gas	1.18%	1.54%	-0.36%
Wisconsin Power & Light	1.22%	1.57%	-0.35%
Consolidated Edison	0.87%	1.18%	-0.31%
Questar	1.89%	2.10%	-0.21%
Washington Gas Light	2.08%	2.19%	-0.11%
Wisconsin Gas	1.57%	1.67%	-0.10%
Southern California Gas	1.52%	1.61%	-0.10%
New Jersey Natural	1.77%	1.62%	0.15%
Northwest Natural Gas	1.94%	1.70%	0.24%
Pacific Gas & Electric	2.11%	1.73%	0.38%
Illinois Power	1.98%	1.52%	0.46%
North Shore Gas	1.97%	1.46%	0.51%
East Ohio Gas	2.00%	1.48%	0.51%
Southwest Gas	2.63%	2.08%	0.55%
Central Hudson Gas & Electric	2.00%	1.25%	0.75%
Nstar Gas	2.54%	1.56%	0.97%
Cascade Natural Gas	2.70%	1.28%	1.42%
Average	**1.04%**	**1.61%**	**-0.57%**

COMPARISON OF TFP PROJECTIONS AND INDEX TRENDS:
GD CAPITAL COSTING AND COMMMON TECHNOLOGICAL CHANGE

Company	TFP Index Trend [A]	Econometric TFP Projection [B]	Difference [A]-[B]
Alabama Gas	-2.11%	1.45%	-3.57%
Orange and Rockland	-1.10%	1.52%	-2.61%
PSEG	-0.61%	1.59%	-2.20%
San Diego Gas & Electric	-0.59%	1.47%	-2.06%
Connecticut Natural Gas	-0.27%	1.41%	-1.68%
LGE	-0.08%	1.52%	-1.60%
Consumers Power	0.46%	1.76%	-1.30%
People's Natural Gas	0.30%	1.45%	-1.15%
Peoples Gas Light & Coke	0.14%	1.27%	-1.14%
Public Service of NC	0.41%	1.54%	-1.13%
Puget Sound Energy	0.95%	1.88%	-0.94%
MG&E	0.74%	1.59%	-0.85%
PECO	0.81%	1.62%	-0.81%
Rochester Gas and Electric	0.79%	1.51%	-0.71%
Nicor	1.18%	1.84%	-0.65%
Consolidated Edison	0.87%	1.48%	-0.61%
Pg Energy	0.90%	1.50%	-0.60%
Niagara Mohawk	0.98%	1.51%	-0.53%
Southern CT Gas	1.18%	1.56%	-0.38%
Atlanta Gas Light	1.32%	1.67%	-0.36%
Baltimore Gas and Electric	1.29%	1.61%	-0.32%
Wisconsin Power & Light	1.22%	1.46%	-0.25%
Southern California Gas	1.52%	1.64%	-0.12%
Washington Gas Light	2.08%	2.15%	-0.07%
Wisconsin Gas	1.57%	1.58%	-0.01%
New Jersey Natural	1.77%	1.77%	0.00%
Questar	1.89%	1.81%	0.07%
Northwest Natural Gas	1.94%	1.69%	0.25%
East Ohio Gas	2.00%	1.64%	0.35%
North Shore Gas	1.97%	1.60%	0.37%
Pacific Gas & Electric	2.11%	1.67%	0.44%
Illinois Power	1.98%	1.45%	0.53%
Central Hudson Gas & Electric	2.00%	1.42%	0.59%
Southwest Gas	2.63%	1.84%	0.80%
Nstar Gas	2.54%	1.57%	0.97%
Cascade Natural Gas	2.70%	1.35%	1.35%
Average	**1.04%**	**1.59%**	**-0.55%**

Answer to Information Request 38 from EGD

March Report

		Costs by Input Category							Costs Shares for GD				Cost Shares for COS			
Company	Year	Labour	Non-labor	Capital: GD	Capital: COS	Fuel	Total: GD	Total: COS	Labour	Non-Labour	Capital	Fuel	Labour	Non-Labour	Capital	Fuel
		[A]	[B]	[C]	[D]		[E] = A+B+C	[F] = A+B+D	A/E	B/E	C/E		A/F	B/F	C/F	
Enbridge	2000	72.6	154.1	399.7	426.6	N/A	626.4	653.3	11.6%	22.6%	66.7%	N/A	11.1%	23.6%	65.3%	N/A
Enbridge	2001	73.9	169.1	502.4	438.8	N/A	745.4	681.8	9.9%	22.7%	67.4%	N/A	10.8%	24.8%	64.4%	N/A
Enbridge	2002	66.4	169.3	612.4	448.5	N/A	848.1	684.2	7.8%	20.0%	72.2%	N/A	9.7%	24.7%	65.6%	N/A
Enbridge	2003	74.9	204.0	666.1	450.3	N/A	945.0	729.2	7.9%	21.6%	70.5%	N/A	10.3%	28.0%	61.8%	N/A
Enbridge	2004	82.0	210.0	464.0	451.3	N/A	756.0	743.3	10.9%	27.8%	61.4%	N/A	11.0%	28.2%	60.7%	N/A
Enbridge	2005	87.9	209.1	220.2	449.8	N/A	517.2	746.8	17.0%	40.4%	42.6%	N/A	11.8%	28.0%	60.2%	N/A

		Costs by Input Category							Costs Shares for GD				Cost Shares for COS			
Company	Year	Labour	Non-labor	Capital: GD	Capital: COS	Fuel	Total: GD	Total: COS	Labour	Non-Labour	Capital	Fuel	Labour	Non-Labour	Capital	Fuel
		[A]	[B]	[C]	[D]	[G]	[E] = A+B+C+G	[F] = A+B+D+G	A/E	B/E	C/E	G/E	A/F	B/F	C/F	G/F
Union	1999	147,498,000	106,383,200	411,401,504	375,952,000	9,911,188	675,193,892	639,744,388	21.8%	15.8%	60.9%	1.5%	23.1%	16.6%	58.8%	1.5%
Union	2000	145,714,400	101,218,760	405,228,352	399,281,376	19,205,642	671,367,154	665,420,178	21.7%	15.1%	60.4%	2.9%	21.9%	15.2%	60.0%	2.9%
Union	2001	144,134,704	105,895,096	496,768,160	408,950,592	22,673,016	769,470,976	681,653,408	18.7%	13.8%	64.6%	2.9%	21.1%	15.5%	60.0%	3.3%
Union	2002	150,048,800	127,822,584	597,342,016	476,687,104	20,776,936	895,990,336	775,335,424	16.7%	14.3%	66.7%	2.3%	19.4%	16.5%	61.5%	2.7%
Union	2003	155,635,360	122,005,496	648,283,648	420,357,536	35,891,592	961,816,096	733,889,984	16.2%	12.7%	67.4%	3.7%	21.2%	16.6%	57.3%	4.9%
Union	2004	162,529,408	129,854,968	460,385,568	409,055,648	35,760,616	788,530,560	737,200,640	20.6%	16.5%	58.4%	4.5%	22.0%	17.6%	55.5%	4.9%
Union	2005	173,001,392	121,766,048	246,557,664	403,129,824	38,958,224	580,283,328	736,855,488	29.8%	21.0%	42.5%	6.7%	23.5%	16.5%	54.7%	5.3%

Answer to Information Request 38 from EGD

June Report

		Costs by Input Category							Costs Shares for GD				Cost Shares for COS			
Company	Year	Labour	Non-labor	Capital: GD	Capital: COS	Fuel	Total: GD	Total: COS	Labour	Non-Labour	Capital	Fuel	Labour	Non-Labour	Capital	Fuel
		[A]	[B]	[C]	[D]		[E] = A+B+C	[F] = A+B+D	A/E	B/E	C/E		A/F	B/F	C/F	
Enbridge	2000	72.6	154.1	453.6	426.9	N/A	680.3	653.6	10.7%	22.6%	66.7%	N/A	11.1%	23.6%	65.3%	N/A
Enbridge	2001	73.9	169.1	533.4	439.1	N/A	776.4	682.1	9.5%	21.8%	68.7%	N/A	10.8%	24.8%	64.4%	N/A
Enbridge	2002	66.4	169.3	550.1	448.9	N/A	785.8	684.6	8.4%	21.5%	70.0%	N/A	9.7%	24.7%	65.6%	N/A
Enbridge	2003	74.9	204.0	588.7	450.7	N/A	867.6	729.6	8.6%	23.5%	67.9%	N/A	10.3%	28.0%	61.8%	N/A
Enbridge	2004	82.0	210.0	517.1	451.7	N/A	809.1	743.7	10.1%	25.9%	63.9%	N/A	11.0%	28.2%	60.7%	N/A
Enbridge	2005	87.9	209.1	481.6	450.2	N/A	778.6	747.2	11.3%	26.8%	61.9%	N/A	11.8%	28.0%	60.3%	N/A

		Costs by Input Category							Costs Shares for GD				Cost Shares for COS			
Company	Year	Labour	Non-labor	Capital: GD	Capital: COS	Fuel	Total: GD	Total: COS	Labour	Non-Labour	Capital	Fuel	Labour	Non-Labour	Capital	Fuel
		[A]	[B]	[C]	[D]	[G]	[E] = A+B+C+G	[F] = A+B+D+G	A/E	B/E	C/E	G/E	A/F	B/F	C/F	G/F
Union	1999	147,498,000	106,383,200	438,152,896	376,129,760	9,911,188	701,945,284	639,922,148	21.0%	15.2%	62.4%	1.4%	23.0%	16.6%	58.8%	1.5%
Union	2000	145,714,400	101,218,760	450,610,400	399,523,200	19,205,642	716,749,202	665,662,002	20.3%	14.1%	62.9%	2.7%	21.9%	15.2%	60.0%	2.9%
Union	2001	144,134,704	105,895,096	519,271,488	409,240,064	22,673,016	791,974,304	681,942,880	18.2%	13.4%	65.6%	2.9%	21.1%	15.5%	60.0%	3.3%
Union	2002	150,048,800	127,822,584	532,868,128	477,115,168	20,776,936	831,516,448	775,763,488	18.0%	15.4%	64.1%	2.5%	19.3%	16.5%	61.5%	2.7%
Union	2003	155,635,360	122,005,496	569,637,760	420,746,976	35,891,592	883,170,208	734,279,424	17.6%	13.8%	64.5%	4.1%	21.2%	16.6%	57.3%	4.9%
Union	2004	162,529,408	129,854,968	499,269,152	409,461,120	35,760,616	827,414,144	737,606,112	19.6%	15.7%	60.3%	4.3%	22.0%	17.6%	55.5%	4.8%
Union	2005	173,001,392	121,766,048	464,397,696	403,572,416	38,958,224	798,123,360	737,298,080	21.7%	15.3%	58.2%	4.9%	23.5%	16.5%	54.7%	5.3%

Enbridge #39

INTERROGATORY

Ref: Input Price Differential

Issue Number:
Issue:

Please provide the following:

a. The input price index levels and growth rates, for all U.S. sample utilities, and for each year 1994-2004, constructed in a comparable manner and consistent (in other words using the same data) with the input quantity indices and growth rates found in Table 2. Do this for both the GD and COS methods. Provide all the data, programming code and spreadsheets.
b. The data, programming code and spreadsheets showing how the U.S. sample input price indices from part a), using both GD and COS methods, were constructed from company-specific input price indices.

RESPONSE

This question is subject to several interpretations. We answer with our best guess as to the Company's intent. We report in the attached table labeled "EGD-39 Attachment" results for implicit input price indexes calculated using the following general formula:

$$\ln(W_t/W_{t-1}) = \ln(C_t/C_{t-1}) - \ln(X_t/X_{t-1}).$$

Here for each year t of the sample period,

W_t = implicit input price index
C_t = index of cost used in the cost share weighting
X_t = Tornqvist input quantity index.

Witness: Mark Lowry

Please note that, due to the implicit character of these calculations, results are sensitive to the year to year fluctuations in company spending on taxes and on pensions and other benefits.

CALCULATION OF INPU

Company	ID	Year	COS Cost	COS Cost Index
Alabama Gas	1	1994	164,505	1.00000
Alabama Gas	1	1995	165,777	1.00773
Alabama Gas	1	1996	178,030	1.08221
Alabama Gas	1	1997	181,399	1.10270
Alabama Gas	1	1998	186,732	1.13511
Alabama Gas	1	1999	197,687	1.20171
Alabama Gas	1	2000	200,438	1.21843
Alabama Gas	1	2001	230,926	1.40376
Alabama Gas	1	2002	223,164	1.35658
Alabama Gas	1	2003	239,950	1.45862
Alabama Gas	1	2004	253,278	1.53963
Atlanta Gas Light	2	1994	439,939	1.00000
Atlanta Gas Light	2	1995	448,324	1.01906
Atlanta Gas Light	2	1996	469,636	1.06750
Atlanta Gas Light	2	1997	465,795	1.05877
Atlanta Gas Light	2	1998	463,438	1.05342
Atlanta Gas Light	2	1999	484,984	1.10239
Atlanta Gas Light	2	2000	462,533	1.05136
Atlanta Gas Light	2	2001	487,432	1.10795
Atlanta Gas Light	2	2002	465,580	1.05828
Atlanta Gas Light	2	2003	480,427	1.09203
Atlanta Gas Light	2	2004	506,531	1.15137
Baltimore Gas and Electric	3	1994	189,796	1.00000
Baltimore Gas and Electric	3	1995	196,818	1.03700
Baltimore Gas and Electric	3	1996	209,440	1.10350
Baltimore Gas and Electric	3	1997	207,769	1.09470
Baltimore Gas and Electric	3	1998	212,010	1.11704
Baltimore Gas and Electric	3	1999	235,707	1.24190
Baltimore Gas and Electric	3	2000	244,558	1.28853
Baltimore Gas and Electric	3	2001	263,924	1.39056
Baltimore Gas and Electric	3	2002	253,514	1.33572
Baltimore Gas and Electric	3	2003	251,438	1.32478
Baltimore Gas and Electric	3	2004	249,704	1.31564
Cascade Natural Gas	6	1994	76,656	1.00000
Cascade Natural Gas	6	1995	81,436	1.06235
Cascade Natural Gas	6	1996	88,696	1.15706
Cascade Natural Gas	6	1997	89,593	1.16876
Cascade Natural Gas	6	1998	90,566	1.18145
Cascade Natural Gas	6	1999	99,924	1.30354
Cascade Natural Gas	6	2000	129,241	1.68598
Cascade Natural Gas	6	2001	114,866	1.49846
Cascade Natural Gas	6	2002	112,160	1.46316
Cascade Natural Gas	6	2003	114,167	1.48934
Cascade Natural Gas	6	2004	114,732	1.49671
Central Hudson Gas & Electric	7	1994	44,266	1.00000

Central Hudson Gas & Electric	7	1995	41,669	0.94132
Central Hudson Gas & Electric	7	1996	43,706	0.98734
Central Hudson Gas & Electric	7	1997	39,448	0.89115
Central Hudson Gas & Electric	7	1998	36,649	0.82792
Central Hudson Gas & Electric	7	1999	39,491	0.89212
Central Hudson Gas & Electric	7	2000	41,188	0.93047
Central Hudson Gas & Electric	7	2001	45,527	1.02849
Central Hudson Gas & Electric	7	2002	42,305	0.95569
Central Hudson Gas & Electric	7	2003	44,655	1.00879
Central Hudson Gas & Electric	7	2004	46,850	1.05836
Nstar Gas	9	1994	122,830	1.00000
Nstar Gas	9	1995	125,328	1.02034
Nstar Gas	9	1996	132,550	1.07913
Nstar Gas	9	1997	128,537	1.04647
Nstar Gas	9	1998	121,167	0.98646
Nstar Gas	9	1999	118,821	0.96736
Nstar Gas	9	2000	129,647	1.05550
Nstar Gas	9	2001	128,514	1.04628
Nstar Gas	9	2002	129,465	1.05402
Nstar Gas	9	2003	146,185	1.19014
Nstar Gas	9	2004	136,034	1.10750
Connecticut Energy	10	1994	106,436	1.00000
Connecticut Energy	10	1995	107,790	1.01271
Connecticut Energy	10	1996	108,769	1.02192
Connecticut Energy	10	1997	104,968	0.98621
Connecticut Energy	10	1998	102,260	0.96076
Connecticut Energy	10	1999	128,612	1.20835
Connecticut Energy	10	2000	118,306	1.11152
Connecticut Energy	10	2001	117,786	1.10664
Connecticut Energy	10	2002	120,572	1.13281
Connecticut Energy	10	2003	121,400	1.14059
Connecticut Energy	10	2004	122,646	1.15230
Connecticut Natural Gas	11	1994	103,306	1.00000
Connecticut Natural Gas	11	1995	104,219	1.00883
Connecticut Natural Gas	11	1996	116,390	1.12665
Connecticut Natural Gas	11	1997	111,562	1.07991
Connecticut Natural Gas	11	1998	105,188	1.01821
Connecticut Natural Gas	11	1999	110,554	1.07016
Connecticut Natural Gas	11	2000	117,307	1.13553
Connecticut Natural Gas	11	2001	113,577	1.09942
Connecticut Natural Gas	11	2002	112,704	1.09097
Connecticut Natural Gas	11	2003	117,725	1.13957
Connecticut Natural Gas	11	2004	122,942	1.19008
Consolidated Edison	12	1994	528,857	1.00000
Consolidated Edison	12	1995	532,346	1.00660
Consolidated Edison	12	1996	564,098	1.06664
Consolidated Edison	12	1997	553,711	1.04700
Consolidated Edison	12	1998	534,485	1.01064
Consolidated Edison	12	1999	556,870	1.05297
Consolidated Edison	12	2000	540,275	1.02159
Consolidated Edison	12	2001	578,820	1.09447

Consolidated Edison	12	2002	541,184	1.02331
Consolidated Edison	12	2003	565,643	1.06956
Consolidated Edison	12	2004	584,693	1.10558
Consumers Power	13	1994	445,730	1.00000
Consumers Power	13	1995	461,813	1.03608
Consumers Power	13	1996	471,124	1.05697
Consumers Power	13	1997	439,051	0.98501
Consumers Power	13	1998	424,760	0.95295
Consumers Power	13	1999	470,577	1.05574
Consumers Power	13	2000	455,017	1.02083
Consumers Power	13	2001	497,943	1.11714
Consumers Power	13	2002	523,186	1.17377
Consumers Power	13	2003	576,555	1.29351
Consumers Power	13	2004	558,009	1.25190
East Ohio Gas	15	1994	444,718	1.00000
East Ohio Gas	15	1995	445,841	1.00253
East Ohio Gas	15	1996	407,806	0.91700
East Ohio Gas	15	1997	443,679	0.99766
East Ohio Gas	15	1998	379,869	0.85418
East Ohio Gas	15	1999	487,848	1.09698
East Ohio Gas	15	2000	499,364	1.12288
East Ohio Gas	15	2001	448,594	1.00872
East Ohio Gas	15	2002	406,964	0.91511
East Ohio Gas	15	2003	431,604	0.97051
East Ohio Gas	15	2004	376,440	0.84647
Illinois Power	17	1994	134,400	1.00000
Illinois Power	17	1995	137,687	1.02446
Illinois Power	17	1996	137,108	1.02015
Illinois Power	17	1997	138,150	1.02790
Illinois Power	17	1998	131,617	0.97929
Illinois Power	17	1999	136,747	1.01747
Illinois Power	17	2000	148,262	1.10314
Illinois Power	17	2001	156,042	1.16103
Illinois Power	17	2002	137,228	1.02105
Illinois Power	17	2003	145,360	1.08155
Illinois Power	17	2004	150,257	1.11799
Niagara Mohawk	21	1994	304,319	1.00000
Niagara Mohawk	21	1995	298,003	0.97925
Niagara Mohawk	21	1996	309,747	1.01784
Niagara Mohawk	21	1997	302,700	0.99468
Niagara Mohawk	21	1998	288,639	0.94848
Niagara Mohawk	21	1999	319,091	1.04854
Niagara Mohawk	21	2000	324,029	1.06477
Niagara Mohawk	21	2001	334,902	1.10050
Niagara Mohawk	21	2002	331,478	1.08925
Niagara Mohawk	21	2003	354,721	1.16562
Niagara Mohawk	21	2004	320,461	1.05305
North Shore Gas	22	1994	68,965	1.00000
North Shore Gas	22	1995	64,482	0.93500
North Shore Gas	22	1996	73,646	1.06788
North Shore Gas	22	1997	68,589	0.99455

North Shore Gas	22	1998	63,711	0.92382
North Shore Gas	22	1999	71,445	1.03597
North Shore Gas	22	2000	79,802	1.15715
North Shore Gas	22	2001	75,932	1.10103
North Shore Gas	22	2002	76,332	1.10682
North Shore Gas	22	2003	80,759	1.17101
North Shore Gas	22	2004	81,591	1.18308
Northern Illinois Gas	23	1994	532,022	1.00000
Northern Illinois Gas	23	1995	528,432	0.99325
Northern Illinois Gas	23	1996	559,127	1.05095
Northern Illinois Gas	23	1997	541,133	1.01713
Northern Illinois Gas	23	1998	488,676	0.91853
Northern Illinois Gas	23	1999	562,774	1.05780
Northern Illinois Gas	23	2000	599,571	1.12697
Northern Illinois Gas	23	2001	619,637	1.16468
Northern Illinois Gas	23	2002	602,878	1.13318
Northern Illinois Gas	23	2003	662,781	1.24578
Northern Illinois Gas	23	2004	687,659	1.29254
Northwest Natural Gas	24	1994	187,005	1.00000
Northwest Natural Gas	24	1995	190,104	1.01657
Northwest Natural Gas	24	1996	206,149	1.10237
Northwest Natural Gas	24	1997	199,695	1.06786
Northwest Natural Gas	24	1998	206,519	1.10435
Northwest Natural Gas	24	1999	231,134	1.23598
Northwest Natural Gas	24	2000	235,456	1.25909
Northwest Natural Gas	24	2001	269,072	1.43885
Northwest Natural Gas	24	2002	259,796	1.38925
Northwest Natural Gas	24	2003	274,339	1.46702
Northwest Natural Gas	24	2004	270,871	1.44847
Orange and Rockland	26	1994	56,194	1.00000
Orange and Rockland	26	1995	69,651	1.23948
Orange and Rockland	26	1996	75,902	1.35073
Orange and Rockland	26	1997	70,060	1.24677
Orange and Rockland	26	1998	67,294	1.19754
Orange and Rockland	26	1999	79,005	1.40594
Orange and Rockland	26	2000	81,659	1.45317
Orange and Rockland	26	2001	69,817	1.24243
Orange and Rockland	26	2002	60,404	1.07493
Orange and Rockland	26	2003	77,616	1.38123
Orange and Rockland	26	2004	68,263	1.21478
Pacific Gas & Electric	27	1994	1,509,936	1.00000
Pacific Gas & Electric	27	1995	1,533,000	1.01527
Pacific Gas & Electric	27	1996	1,375,328	0.91085
Pacific Gas & Electric	27	1997	1,380,948	0.91457
Pacific Gas & Electric	27	1998	1,219,056	0.80736
Pacific Gas & Electric	27	1999	1,349,839	0.89397
Pacific Gas & Electric	27	2000	1,431,864	0.94829
Pacific Gas & Electric	27	2001	1,430,613	0.94747
Pacific Gas & Electric	27	2002	1,397,201	0.92534
Pacific Gas & Electric	27	2003	1,356,057	0.89809
Pacific Gas & Electric	27	2004	1,410,839	0.93437

PECO	28	1994	214,745	1.00000
PECO	28	1995	202,217	0.94166
PECO	28	1996	205,478	0.95685
PECO	28	1997	208,188	0.96947
PECO	28	1998	181,643	0.84585
PECO	28	1999	211,832	0.98643
PECO	28	2000	239,885	1.11707
PECO	28	2001	241,520	1.12468
PECO	28	2002	234,161	1.09041
PECO	28	2003	247,148	1.15089
PECO	28	2004	232,446	1.08243
Peoples Gas Light & Coke	29	1994	560,370	1.00000
Peoples Gas Light & Coke	29	1995	533,045	0.95124
Peoples Gas Light & Coke	29	1996	565,969	1.00999
Peoples Gas Light & Coke	29	1997	510,982	0.91187
Peoples Gas Light & Coke	29	1998	459,498	0.81999
Peoples Gas Light & Coke	29	1999	510,928	0.91177
Peoples Gas Light & Coke	29	2000	521,788	0.93115
Peoples Gas Light & Coke	29	2001	581,361	1.03746
Peoples Gas Light & Coke	29	2002	539,819	0.96333
Peoples Gas Light & Coke	29	2003	583,121	1.04060
Peoples Gas Light & Coke	29	2004	605,518	1.08057
People's Natural Gas	30	1994	184,874	1.00000
People's Natural Gas	30	1995	185,749	1.00473
People's Natural Gas	30	1996	192,385	1.04063
People's Natural Gas	30	1997	178,207	0.96393
People's Natural Gas	30	1998	146,537	0.79263
People's Natural Gas	30	1999	135,314	0.73193
People's Natural Gas	30	2000	167,765	0.90745
People's Natural Gas	30	2001	159,336	0.86187
People's Natural Gas	30	2002	139,550	0.75484
People's Natural Gas	30	2003	155,096	0.83893
People's Natural Gas	30	2004	158,363	0.85660
PG Energy	31	1994	65,672	1.00000
PG Energy	31	1995	66,856	1.01803
PG Energy	31	1996	72,278	1.10058
PG Energy	31	1997	73,651	1.12150
PG Energy	31	1998	69,879	1.06406
PG Energy	31	1999	87,525	1.33276
PG Energy	31	2000	75,360	1.14753
PG Energy	31	2001	71,872	1.09441
PG Energy	31	2002	62,710	0.95489
PG Energy	31	2003	70,062	1.06684
PG Energy	31	2004	72,830	1.10900
Public Service Electric & Gas	34	1994	681,637	1.00000
Public Service Electric & Gas	34	1995	690,277	1.01268
Public Service Electric & Gas	34	1996	682,288	1.00095
Public Service Electric & Gas	34	1997	687,816	1.00907
Public Service Electric & Gas	34	1998	553,770	0.81241
Public Service Electric & Gas	34	1999	640,768	0.94004
Public Service Electric & Gas	34	2000	631,867	0.92698

Public Service Electric & Gas	34	2001	679,764	0.99725
Public Service Electric & Gas	34	2002	656,979	0.96383
Public Service Electric & Gas	34	2003	757,913	1.11190
Public Service Electric & Gas	34	2004	801,135	1.17531
Public Service of NC	36	1994	119,255	1.00000
Public Service of NC	36	1995	129,112	1.08265
Public Service of NC	36	1996	140,569	1.17872
Public Service of NC	36	1997	142,851	1.19786
Public Service of NC	36	1998	143,807	1.20588
Public Service of NC	36	1999	162,611	1.36356
Public Service of NC	36	2000	159,939	1.34115
Public Service of NC	36	2001	167,572	1.40515
Public Service of NC	36	2002	159,531	1.33773
Public Service of NC	36	2003	171,693	1.43971
Public Service of NC	36	2004	176,926	1.48359
Rochester Gas and Electric	37	1994	122,962	1.00000
Rochester Gas and Electric	37	1995	133,343	1.08442
Rochester Gas and Electric	37	1996	136,816	1.11267
Rochester Gas and Electric	37	1997	132,266	1.07566
Rochester Gas and Electric	37	1998	124,646	1.01369
Rochester Gas and Electric	37	1999	135,634	1.10305
Rochester Gas and Electric	37	2000	131,649	1.07064
Rochester Gas and Electric	37	2001	130,921	1.06472
Rochester Gas and Electric	37	2002	116,505	0.94749
Rochester Gas and Electric	37	2003	134,902	1.09710
Rochester Gas and Electric	37	2004	130,333	1.05995
San Diego Gas & Electric	38	1994	188,693	1.00000
San Diego Gas & Electric	38	1995	175,752	0.93142
San Diego Gas & Electric	38	1996	185,632	0.98378
San Diego Gas & Electric	38	1997	179,036	0.94882
San Diego Gas & Electric	38	1998	195,444	1.03578
San Diego Gas & Electric	38	1999	202,794	1.07473
San Diego Gas & Electric	38	2000	195,896	1.03817
San Diego Gas & Electric	38	2001	228,540	1.21117
San Diego Gas & Electric	38	2002	211,429	1.12049
San Diego Gas & Electric	38	2003	248,874	1.31894
San Diego Gas & Electric	38	2004	223,412	1.18400
Southern California Gas	40	1994	1,566,547	1.00000
Southern California Gas	40	1995	1,482,248	0.94619
Southern California Gas	40	1996	1,369,360	0.87413
Southern California Gas	40	1997	1,348,694	0.86093
Southern California Gas	40	1998	1,359,441	0.86779
Southern California Gas	40	1999	1,458,126	0.93079
Southern California Gas	40	2000	1,409,129	0.89951
Southern California Gas	40	2001	1,578,451	1.00760
Southern California Gas	40	2002	1,590,873	1.01553
Southern California Gas	40	2003	1,641,493	1.04784
Southern California Gas	40	2004	1,694,212	1.08149
Southwest Gas	41	1994	353,461	1.00000
Southwest Gas	41	1995	334,290	0.94576
Southwest Gas	41	1996	358,704	1.01483

Southwest Gas	41	1997	360,582	1.02015
Southwest Gas	41	1998	372,035	1.05255
Southwest Gas	41	1999	426,807	1.20751
Southwest Gas	41	2000	437,066	1.23653
Southwest Gas	41	2001	570,598	1.61432
Southwest Gas	41	2002	570,477	1.61398
Southwest Gas	41	2003	532,797	1.50737
Southwest Gas	41	2004	482,687	1.36560
Washington Gas Light	42	1994	428,317	1.00000
Washington Gas Light	42	1995	427,811	0.99882
Washington Gas Light	42	1996	465,753	1.08740
Washington Gas Light	42	1997	436,803	1.01981
Washington Gas Light	42	1998	420,027	0.98065
Washington Gas Light	42	1999	452,274	1.05593
Washington Gas Light	42	2000	467,377	1.09119
Washington Gas Light	42	2001	495,198	1.15615
Washington Gas Light	42	2002	488,456	1.14041
Washington Gas Light	42	2003	550,227	1.28463
Washington Gas Light	42	2004	477,072	1.11383
Washington Natural Gas	43	1994	207,878	1.00000
Washington Natural Gas	43	1995	208,580	1.00338
Washington Natural Gas	43	1996	215,124	1.03485
Washington Natural Gas	43	1997	218,617	1.05166
Washington Natural Gas	43	1998	218,015	1.04876
Washington Natural Gas	43	1999	252,453	1.21443
Washington Natural Gas	43	2000	295,443	1.42123
Washington Natural Gas	43	2001	297,940	1.43324
Washington Natural Gas	43	2002	284,865	1.37035
Washington Natural Gas	43	2003	298,691	1.43686
Washington Natural Gas	43	2004	325,716	1.56686
Wisconsin Gas	44	1994	202,746	1.00000
Wisconsin Gas	44	1995	182,838	0.90181
Wisconsin Gas	44	1996	184,128	0.90817
Wisconsin Gas	44	1997	171,412	0.84545
Wisconsin Gas	44	1998	157,861	0.77862
Wisconsin Gas	44	1999	174,013	0.85828
Wisconsin Gas	44	2000	177,762	0.87677
Wisconsin Gas	44	2001	171,166	0.84424
Wisconsin Gas	44	2002	173,762	0.85704
Wisconsin Gas	44	2003	197,704	0.97513
Wisconsin Gas	44	2004	208,255	1.02717
Wisconsin Power & Light	45	1994	48,727	1.00000
Wisconsin Power & Light	45	1995	50,015	1.02642
Wisconsin Power & Light	45	1996	54,493	1.11832
Wisconsin Power & Light	45	1997	51,467	1.05622
Wisconsin Power & Light	45	1998	48,593	0.99725
Wisconsin Power & Light	45	1999	51,826	1.06358
Wisconsin Power & Light	45	2000	53,607	1.10015
Wisconsin Power & Light	45	2001	55,551	1.14005
Wisconsin Power & Light	45	2002	68,027	1.39607
Wisconsin Power & Light	45	2003	78,724	1.61561

Wisconsin Power & Light	45	2004	79,582	1.63321
Mountain Fuel Supply	46	1994	181,034	1.00000
Mountain Fuel Supply	46	1995	186,838	1.03206
Mountain Fuel Supply	46	1996	195,753	1.08131
Mountain Fuel Supply	46	1997	195,340	1.07903
Mountain Fuel Supply	46	1998	190,002	1.04954
Mountain Fuel Supply	46	1999	206,724	1.14191
Mountain Fuel Supply	46	2000	217,947	1.20390
Mountain Fuel Supply	46	2001	232,747	1.28566
Mountain Fuel Supply	46	2002	232,720	1.28551
Mountain Fuel Supply	46	2003	251,922	1.39158
Mountain Fuel Supply	46	2004	257,514	1.42247
New Jersey Natural	49	1994	180,139	1.00000
New Jersey Natural	49	1995	184,341	1.02332
New Jersey Natural	49	1996	192,785	1.07020
New Jersey Natural	49	1997	187,671	1.04181
New Jersey Natural	49	1998	182,125	1.01102
New Jersey Natural	49	1999	200,309	1.11197
New Jersey Natural	49	2000	205,716	1.14198
New Jersey Natural	49	2001	226,206	1.25573
New Jersey Natural	49	2002	217,042	1.20486
New Jersey Natural	49	2003	237,757	1.31985
New Jersey Natural	49	2004	230,773	1.28108
Louisville Gas & Electric	53	1994	73,103	1.00000
Louisville Gas & Electric	53	1995	71,488	0.97792
Louisville Gas & Electric	53	1996	72,318	0.98926
Louisville Gas & Electric	53	1997	71,641	0.98000
Louisville Gas & Electric	53	1998	65,134	0.89099
Louisville Gas & Electric	53	1999	70,306	0.96174
Louisville Gas & Electric	53	2000	74,638	1.02101
Louisville Gas & Electric	53	2001	86,759	1.18682
Louisville Gas & Electric	53	2002	89,403	1.22298
Louisville Gas & Electric	53	2003	97,706	1.33656
Louisville Gas & Electric	53	2004	100,237	1.37119
Madison Gas & Electric	57	1994	33,886	1.00000
Madison Gas & Electric	57	1995	35,478	1.04697
Madison Gas & Electric	57	1996	33,167	0.97879
Madison Gas & Electric	57	1997	33,427	0.98645
Madison Gas & Electric	57	1998	32,505	0.95925
Madison Gas & Electric	57	1999	36,297	1.07116
Madison Gas & Electric	57	2000	39,469	1.16475
Madison Gas & Electric	57	2001	42,641	1.25835
Madison Gas & Electric	57	2002	47,253	1.39445
Madison Gas & Electric	57	2003	52,764	1.55709
Madison Gas & Electric	57	2004	55,601	1.64082

Attachment

T PRICE INDEXES BY US LDC

COS Input Quantity	COS Input Price	GD Cost	GD Cost Index	GD Input Quantity
1.00000	1.000	169,768	1.00000	1.00000
1.02956	0.979	172,265	1.01471	1.02868
1.07477	1.007	184,785	1.08845	1.06553
1.10053	1.002	188,335	1.10936	1.09753
1.11124	1.021	193,382	1.13909	1.11302
1.11822	1.075	202,290	1.19156	1.12150
1.10793	1.100	200,747	1.18248	1.09284
1.20122	1.169	223,058	1.31390	1.18379
1.20386	1.127	225,765	1.32984	1.20552
1.24500	1.172	247,215	1.45619	1.24305
1.25037	1.231	238,767	1.40642	1.24638
1.00000	1.000	459,499	1.00000	1.00000
1.02054	0.999	474,161	1.03191	1.01792
1.01525	1.051	501,474	1.09135	1.01368
1.07265	0.987	497,375	1.08243	1.07038
1.01585	1.037	493,914	1.07490	1.02121
1.01956	1.081	506,276	1.10180	1.02033
0.99663	1.055	476,060	1.03604	0.99626
0.96879	1.144	478,727	1.04184	0.97469
0.96071	1.102	484,554	1.05453	0.96348
0.93667	1.166	519,161	1.12984	0.94563
1.01401	1.135	476,068	1.03606	1.02457
1.00000	1.000	206,733	1.00000	1.00000
0.99109	1.046	213,226	1.03141	1.00194
0.99633	1.108	230,894	1.11687	1.00343
1.00915	1.085	228,909	1.10727	1.02004
1.01421	1.101	235,677	1.14001	1.03255
1.02075	1.217	255,346	1.23515	1.05389
0.99138	1.300	261,028	1.26263	1.02956
1.06904	1.301	268,419	1.29839	1.10781
0.98389	1.358	273,043	1.32075	1.01298
0.95052	1.394	275,928	1.33471	0.98622
0.95701	1.375	253,445	1.22595	1.02168
1.00000	1.000	84,387	1.00000	1.00000
1.01735	1.044	86,600	1.02622	1.00890
1.06436	1.087	96,057	1.13829	1.04942
1.08402	1.078	97,815	1.15912	1.09544
1.09932	1.075	99,249	1.17612	1.11074
1.06220	1.227	106,503	1.26208	1.08389
1.06779	1.579	137,073	1.62433	1.09439
1.08502	1.381	118,146	1.40005	1.10987
1.06044	1.380	121,535	1.44020	1.08081
1.05544	1.411	123,654	1.46531	1.07501
1.05548	1.418	114,415	1.35584	1.07173
1.00000	1.000	46,883	1.00000	1.00000

0.94675	0.994	43,970	0.93786	0.94519
0.95783	1.031	47,661	1.01659	0.96951
0.89548	0.995	43,362	0.92488	0.90978
0.88731	0.933	40,834	0.87097	0.90027
0.86760	1.028	42,739	0.91161	0.88293
0.88713	1.049	43,801	0.93426	0.90056
0.88107	1.167	46,056	0.98235	0.88995
0.90422	1.057	45,754	0.97592	0.91895
0.93400	1.080	48,150	1.02702	0.92888
0.96603	1.096	46,009	0.98136	0.96497
1.00000	1.000	129,982	1.00000	1.00000
0.96962	1.052	132,384	1.01847	0.97349
1.00862	1.070	143,080	1.10077	1.01389
0.97542	1.073	138,406	1.06481	0.97771
0.92704	1.064	131,749	1.01359	0.93330
0.84054	1.151	127,310	0.97944	0.85321
0.88438	1.193	137,754	1.05979	0.90448
0.81850	1.278	130,464	1.00370	0.82395
0.86158	1.223	136,475	1.04995	0.85877
0.88435	1.346	156,397	1.20322	0.89553
0.86963	1.274	135,101	1.03938	0.87639
1.00000	1.000	112,971	1.00000	1.00000
1.00693	1.006	114,245	1.01128	1.01261
0.99401	1.028	118,410	1.04814	1.00173
0.98438	1.002	114,511	1.01363	0.99299
1.01212	0.949	113,317	1.00306	1.02702
1.00079	1.207	136,621	1.20935	1.01206
0.99858	1.113	126,648	1.12106	1.03138
0.95572	1.158	118,883	1.05233	0.96305
1.01745	1.113	129,567	1.14690	1.03218
0.96526	1.182	132,509	1.17295	0.98646
0.98706	1.167	122,864	1.08757	1.01051
1.00000	1.000	110,395	1.00000	1.00000
0.96773	1.042	111,298	1.00817	0.97605
1.00898	1.117	126,633	1.14709	1.01736
0.95688	1.129	121,866	1.10391	0.97165
0.94427	1.078	116,177	1.05237	0.95986
0.93439	1.145	119,559	1.08300	0.95315
0.91838	1.236	124,941	1.13176	0.93926
0.87766	1.253	116,504	1.05533	0.89662
0.89591	1.218	122,220	1.10711	0.91732
0.87334	1.305	129,110	1.16952	0.89855
0.92153	1.291	124,280	1.12577	0.94619
1.00000	1.000	570,430	1.00000	1.00000
1.01928	0.988	567,025	0.99403	1.00940
1.03530	1.030	616,284	1.08039	1.03558
1.00543	1.041	606,401	1.06306	1.01389
0.98785	1.023	592,056	1.03791	1.00247
0.97017	1.085	605,482	1.06145	0.99433
0.98502	1.037	579,575	1.01603	1.00568
0.98254	1.114	593,350	1.04018	1.00207

0.94876	1.079	584,088	1.02394	0.95385
0.93604	1.143	619,801	1.08655	0.95111
0.93423	1.183	583,536	1.02297	0.95490
1.00000	1.000	506,965	1.00000	1.00000
1.01546	1.020	521,817	1.02930	1.01968
1.02116	1.035	536,369	1.05800	1.02889
0.94134	1.046	503,267	0.99271	0.95557
0.91846	1.038	484,716	0.95611	0.94315
0.93233	1.132	528,229	1.04194	0.95688
0.89205	1.144	505,335	0.99678	0.92141
0.92297	1.210	532,787	1.05094	0.95366
0.99667	1.178	567,950	1.12029	0.99534
1.03030	1.255	632,731	1.24808	1.04067
1.06139	1.179	563,335	1.11119	1.09050
1.00000	1.000	481,401	1.00000	1.00000
0.99495	1.008	481,459	1.00012	0.99896
0.98840	0.928	447,390	0.92935	0.99895
1.00794	0.990	482,549	1.00239	1.01363
0.97930	0.872	415,846	0.86382	0.99309
1.17332	0.935	517,377	1.07473	1.15826
1.07589	1.044	527,805	1.09639	1.08257
1.03191	0.978	469,356	0.97498	1.05014
0.97195	0.942	441,508	0.91713	0.98731
0.90600	1.071	470,997	0.97839	0.92803
0.85918	0.985	383,030	0.79566	0.88623
1.00000	1.000	154,578	1.00000	1.00000
0.98186	1.043	156,565	1.01286	0.98035
0.93098	1.096	159,305	1.03058	0.94882
0.92832	1.107	159,156	1.02961	0.93456
0.88552	1.106	151,165	0.97792	0.90344
0.87837	1.158	156,335	1.01136	0.90066
0.95680	1.153	165,042	1.06769	0.96793
0.91681	1.266	169,096	1.09392	0.93814
0.86134	1.185	157,652	1.01988	0.88677
0.82772	1.307	168,231	1.08832	0.85780
0.78607	1.422	156,452	1.01212	0.81621
1.00000	1.000	327,262	1.00000	1.00000
0.96018	1.020	318,736	0.97395	0.96431
1.00144	1.016	342,254	1.04581	1.01803
0.96638	1.029	334,760	1.02291	0.98703
0.95123	0.997	323,974	0.98995	0.97897
0.98013	1.070	345,261	1.05500	0.99727
1.02006	1.044	348,211	1.06401	1.04790
1.01515	1.084	346,611	1.05912	1.04862
1.00673	1.082	363,075	1.10943	1.03911
0.97204	1.199	387,111	1.18288	0.99159
0.88482	1.190	327,019	0.99926	0.93002
1.00000	1.000	74,269	1.00000	1.00000
0.96493	0.969	69,436	0.93493	0.96435
0.95272	1.121	79,489	1.07030	0.95704
0.98882	1.006	75,061	1.01067	0.99400

0.96921	0.953	69,609	0.93726	0.97783
0.98476	1.052	76,421	1.02898	0.98702
1.09940	1.053	84,354	1.13580	1.10334
0.93073	1.183	78,580	1.05805	0.94546
0.95952	1.154	82,330	1.10854	0.96943
0.94418	1.240	87,827	1.18256	0.95635
0.92759	1.275	82,139	1.10597	0.94327
1.00000	1.000	617,365	1.00000	1.00000
1.00829	0.985	609,195	0.98677	1.00856
0.99554	1.056	652,906	1.05757	1.01312
0.97631	1.042	638,145	1.03366	1.00031
0.95899	0.958	576,405	0.93365	0.98635
0.98809	1.071	647,107	1.04818	1.01020
1.12224	1.004	674,376	1.09235	1.13285
0.95747	1.216	671,262	1.08730	0.98129
0.95863	1.182	688,232	1.11479	0.98313
0.97403	1.279	758,125	1.22800	0.99807
0.99792	1.295	709,073	1.14855	1.02709
1.00000	1.000	209,373	1.00000	1.00000
1.01651	1.000	208,329	0.99501	1.02245
1.08542	1.016	230,284	1.09987	1.07823
1.10553	0.966	218,737	1.04473	1.08381
1.13390	0.974	228,886	1.09320	1.12795
1.12984	1.094	245,194	1.17109	1.12468
1.10203	1.143	255,098	1.21839	1.11899
1.16676	1.233	275,785	1.31720	1.18482
1.15136	1.207	285,780	1.36494	1.17045
1.19613	1.226	297,725	1.42198	1.19613
1.17372	1.234	266,517	1.27293	1.18018
1.00000	1.000	61,387	1.00000	1.00000
1.35351	0.916	74,737	1.21747	1.33372
1.34347	1.005	83,022	1.35243	1.33090
1.31690	0.947	76,420	1.24488	1.29196
1.31705	0.909	74,241	1.20939	1.29952
1.42411	0.987	84,240	1.37227	1.39432
1.50981	0.962	86,102	1.40260	1.48251
1.24219	1.000	71,604	1.16644	1.24081
1.28464	0.837	66,592	1.08478	1.28081
1.33209	1.037	84,516	1.37677	1.31601
1.23539	0.983	68,014	1.10794	1.22464
1.00000	1.000	1,618,253	1.00000	1.00000
1.01022	1.005	1,621,127	1.00178	1.01417
1.02670	0.887	1,520,563	0.93963	1.02433
0.95025	0.962	1,512,772	0.93482	0.95096
0.90469	0.892	1,364,128	0.84296	0.91061
0.88083	1.015	1,451,923	0.89722	0.88933
0.89877	1.055	1,569,152	0.96966	0.91531
0.85631	1.106	1,475,968	0.91207	0.86130
0.88068	1.051	1,546,352	0.95557	0.88085
0.88765	1.012	1,516,856	0.93734	0.89103
0.90123	1.037	1,420,366	0.87772	0.90356

1.00000	1.000	238,121	1.00000	1.00000
0.97605	0.965	225,299	0.94616	0.98499
0.95421	1.003	235,784	0.99019	0.96171
0.97209	0.997	236,801	0.99446	0.97447
0.88878	0.952	215,352	0.90438	0.91926
0.85414	1.155	240,316	1.00922	0.89121
1.03017	1.084	238,804	1.00287	0.94384
1.01499	1.108	240,274	1.00904	1.02218
1.05696	1.032	262,316	1.10161	1.09122
1.06622	1.079	279,067	1.17196	1.08947
1.04116	1.040	231,783	0.97338	1.06996
1.00000	1.000	615,505	1.00000	1.00000
0.98500	0.966	586,185	0.95236	0.98671
0.99164	1.019	624,872	1.01522	0.99636
0.96940	0.941	571,343	0.92825	0.97687
0.94104	0.871	512,921	0.83333	0.94971
0.92819	0.982	564,115	0.91651	0.94375
0.91328	1.020	567,146	0.92143	0.92760
0.90530	1.146	612,904	0.99578	0.92365
0.90361	1.066	596,939	0.96984	0.92833
0.89207	1.166	646,579	1.05049	0.91628
0.87536	1.234	622,149	1.01079	0.90520
1.00000	1.000	204,145	1.00000	1.00000
0.99890	1.006	204,350	1.00100	1.00151
0.97280	1.070	213,172	1.04422	0.98346
0.95209	1.012	199,355	0.97653	0.96535
0.82256	0.964	166,434	0.81527	0.85453
0.77243	0.948	154,902	0.75878	0.80940
1.02903	0.882	183,240	0.89760	1.03726
1.01233	0.851	171,578	0.84047	1.03440
0.93298	0.809	158,514	0.77648	0.95470
0.82853	1.013	176,746	0.86579	0.86327
0.94102	0.910	162,517	0.79608	0.97211
1.00000	1.000	75,203	1.00000	1.00000
0.99791	1.020	75,664	1.00613	0.99785
1.06558	1.033	82,813	1.10119	1.04896
1.05711	1.061	83,855	1.11505	1.04749
1.05745	1.006	80,937	1.07625	1.05721
1.09608	1.216	96,651	1.28521	1.09663
1.00083	1.147	83,130	1.10541	1.01526
1.03250	1.060	75,325	1.00162	1.04925
0.90722	1.053	73,169	0.97296	0.94115
0.98588	1.082	81,838	1.08823	1.00674
0.98561	1.125	74,419	0.98958	1.00745
1.00000	1.000	723,091	1.00000	1.00000
0.99765	1.015	730,879	1.01077	1.00304
0.99229	1.009	742,404	1.02671	0.99927
0.97277	1.037	748,989	1.03582	0.98469
1.01059	0.804	617,833	0.85443	1.01520
1.08376	0.867	690,652	0.95514	1.08695
1.04511	0.887	670,968	0.92792	1.04986

1.02947	0.969	687,302	0.95051	1.03604
1.00139	0.962	710,360	0.98239	1.01179
1.08559	1.024	822,201	1.13706	1.09033
1.12350	1.046	797,138	1.10240	1.12965
1.00000	1.000	125,515	1.00000	1.00000
1.04547	1.036	135,810	1.08203	1.03205
1.12694	1.046	148,200	1.18074	1.10557
1.14976	1.042	150,559	1.19953	1.13459
1.19493	1.009	151,373	1.20601	1.18606
1.23478	1.104	167,606	1.33535	1.22854
1.22115	1.098	164,608	1.31147	1.23309
1.26994	1.106	158,476	1.26260	1.23509
1.26572	1.057	163,508	1.30270	1.25974
1.30565	1.103	181,686	1.44753	1.29797
1.33009	1.115	162,403	1.29389	1.32503
1.00000	1.000	136,584	1.00000	1.00000
1.04713	1.036	147,131	1.07722	1.05193
1.04469	1.065	154,015	1.12762	1.04735
1.04534	1.029	148,392	1.08645	1.04454
1.03183	0.982	141,369	1.03503	1.03439
0.98597	1.119	150,615	1.10272	0.99769
0.98799	1.084	144,297	1.05647	0.99785
0.93583	1.138	137,290	1.00517	0.94258
0.94816	0.999	131,853	0.96536	0.96943
0.91024	1.205	153,258	1.12208	0.94328
0.96668	1.096	133,760	0.97932	0.97758
1.00000	1.000	199,497	1.00000	1.00000
1.00139	0.930	184,378	0.92421	1.01171
1.02825	0.957	200,907	1.00707	1.04313
1.05870	0.896	193,473	0.96980	1.07409
1.14604	0.904	211,225	1.05878	1.15834
1.09522	0.981	213,077	1.06807	1.10635
1.06679	0.973	209,181	1.04854	1.08669
1.14065	1.062	233,416	1.17002	1.15769
1.14501	0.979	228,568	1.14572	1.16123
1.26021	1.047	265,964	1.33317	1.26603
1.22518	0.966	224,637	1.12601	1.24000
1.00000	1.000	1,699,199	1.00000	1.00000
0.99109	0.955	1,594,090	0.93814	0.99536
0.90142	0.970	1,525,544	0.89780	0.91268
0.88567	0.972	1,495,014	0.87983	0.90049
0.92822	0.935	1,511,207	0.88936	0.93996
0.89856	1.036	1,584,940	0.93276	0.91245
0.85051	1.058	1,545,261	0.90941	0.86610
0.90134	1.118	1,658,882	0.97627	0.91221
0.91359	1.112	1,739,902	1.02395	0.91989
0.94143	1.113	1,791,891	1.05455	0.94595
0.93880	1.152	1,726,472	1.01605	0.94569
1.00000	1.000	360,138	1.00000	1.00000
1.04087	0.909	347,807	0.96576	1.03629
1.08582	0.935	380,402	1.05627	1.07402

1.10924	0.920	385,649	1.07084	1.11118
1.14509	0.919	398,185	1.10565	1.14496
1.19484	1.011	443,320	1.23097	1.18958
1.20639	1.025	449,997	1.24951	1.22894
1.35262	1.193	541,410	1.50334	1.34111
1.37481	1.174	593,624	1.64832	1.40168
1.26323	1.193	556,791	1.54605	1.28915
1.18490	1.153	458,048	1.27187	1.21021
1.00000	1.000	458,401	1.00000	1.00000
0.96655	1.033	458,034	0.99920	0.97704
1.03826	1.047	507,612	1.10735	1.04158
0.98008	1.041	477,417	1.04148	0.98732
0.98767	0.993	465,211	1.01486	0.99964
0.97612	1.082	483,927	1.05569	0.98502
0.95596	1.141	494,560	1.07888	0.97502
0.99350	1.164	498,211	1.08685	1.01006
1.02619	1.111	522,957	1.14083	1.04142
1.02952	1.248	594,817	1.29759	1.05119
1.04310	1.068	473,067	1.03200	1.06961
1.00000	1.000	222,268	1.00000	1.00000
1.01752	0.986	218,814	0.98446	1.02342
0.97157	1.065	233,887	1.05227	0.98248
1.06358	0.989	236,045	1.06198	1.07048
1.02216	1.026	236,067	1.06208	1.02699
1.02670	1.183	261,322	1.17571	1.03312
1.07652	1.320	307,250	1.38234	1.08480
1.11391	1.287	292,323	1.31518	1.11298
1.15935	1.182	302,317	1.36014	1.16373
1.19162	1.206	317,928	1.43038	1.20099
1.25118	1.252	309,635	1.39307	1.24326
1.00000	1.000	216,335	1.00000	1.00000
0.95634	0.943	196,012	0.90606	0.96156
0.98754	0.920	199,773	0.92344	0.99643
0.93801	0.901	188,026	0.86914	0.95086
0.89378	0.871	173,001	0.79969	0.91197
0.88663	0.968	187,168	0.86518	0.90350
0.91270	0.961	188,550	0.87156	0.92834
0.87973	0.960	176,719	0.81688	0.90055
0.88478	0.969	186,673	0.86289	0.89575
0.95803	1.018	205,245	0.94874	0.92759
0.94767	1.084	204,120	0.94353	0.96505
1.00000	1.000	52,374	1.00000	1.00000
0.91540	1.121	53,597	1.02336	0.92628
0.94361	1.185	58,918	1.12496	0.96048
0.91408	1.155	56,162	1.07232	0.93099
0.95520	1.044	53,213	1.01602	0.97984
0.88620	1.200	55,272	1.05535	0.90557
0.91814	1.198	56,119	1.07152	0.93474
0.95486	1.194	56,171	1.07250	0.97779
1.01960	1.369	72,811	1.39023	1.05626
1.04560	1.545	83,531	1.59490	1.06414

1.00461	1.626	78,016	1.48961	1.02235
1.00000	1.000	205,572	1.00000	1.00000
0.98070	1.052	217,920	1.06006	0.98887
0.99004	1.092	233,380	1.13527	0.99725
1.00751	1.071	231,068	1.12402	1.01946
0.98105	1.070	222,615	1.08290	0.98679
0.99887	1.143	241,266	1.17363	1.01427
0.99962	1.204	238,590	1.16061	0.99631
1.00285	1.282	243,044	1.18228	1.01666
1.01145	1.271	259,462	1.26215	1.02217
1.09364	1.272	281,290	1.36832	1.10765
1.06266	1.339	259,403	1.26186	1.08171
1.00000	1.000	187,294	1.00000	1.00000
0.99067	1.033	191,115	1.02040	0.99249
1.01793	1.051	206,191	1.10090	1.02414
1.02882	1.013	200,493	1.07047	1.02523
1.03227	0.979	197,654	1.05531	1.03581
1.03434	1.075	210,416	1.12345	1.03825
1.06476	1.073	212,785	1.13610	1.06548
1.06705	1.177	224,341	1.19780	1.07339
1.04501	1.153	229,466	1.22516	1.05306
1.08897	1.212	253,693	1.35451	1.09504
1.09890	1.166	225,255	1.20268	1.09695
1.00000	1.000	78,015	1.00000	1.00000
0.97925	0.999	77,065	0.98782	0.98052
0.97639	1.013	80,462	1.03136	1.00414
0.97539	1.005	78,132	1.00150	0.98662
0.94722	0.941	71,943	0.92216	0.97414
0.93653	1.027	74,266	0.95195	0.93963
0.91301	1.118	77,631	0.99508	0.92406
0.93868	1.264	86,026	1.10268	0.95809
1.01590	1.204	90,939	1.16566	1.00802
1.08197	1.235	101,902	1.30619	1.07375
1.08621	1.262	94,268	1.20834	1.11827
1.00000	1.000	38,504	1.00000	1.00000
1.01683	1.030	40,396	1.04913	1.02959
0.95663	1.023	38,473	0.99921	0.97668
0.96249	1.025	38,824	1.00832	0.98262
0.96684	0.992	37,409	0.97157	0.98718
0.97179	1.102	41,023	1.06542	0.98832
1.00517	1.159	43,606	1.13250	1.01878
1.00449	1.253	45,950	1.19338	1.02594
1.05896	1.317	49,702	1.29083	1.01745
1.08759	1.432	56,746	1.47376	1.07978
1.12947	1.453	56,201	1.45962	1.15224

COS Input Price
1.000
0.986
1.022
1.011
1.023
1.062
1.082
1.110
1.103
1.171
1.128
1.000
1.014
1.077
1.011
1.053
1.080
1.040
1.069
1.094
1.195
1.011
1.000
1.029
1.113
1.086
1.104
1.172
1.226
1.172
1.304
1.353
1.200
1.000
1.017
1.085
1.058
1.059
1.164
1.484
1.261
1.333
1.363
1.265
1.000

0.992
1.049
1.017
0.967
1.032
1.037
1.104
1.062
1.106
1.017
1.000
1.046
1.086
1.089
1.086
1.148
1.172
1.218
1.223
1.344
1.186
1.000
0.999
1.046
1.021
0.977
1.195
1.087
1.093
1.111
1.189
1.076
1.000
1.033
1.128
1.136
1.096
1.136
1.205
1.177
1.207
1.302
1.190
1.000
0.985
1.043
1.048
1.035
1.068
1.010
1.038

1.073
1.142
1.071
1.000
1.009
1.028
1.039
1.014
1.089
1.082
1.102
1.126
1.199
1.019
1.000
1.001
0.930
0.989
0.870
0.928
1.013
0.928
0.929
1.054
0.898
1.000
1.033
1.086
1.102
1.082
1.123
1.103
1.166
1.150
1.269
1.240
1.000
1.010
1.027
1.036
1.011
1.058
1.015
1.010
1.068
1.193
1.074
1.000
0.969
1.118
1.017

0.959
1.043
1.029
1.119
1.143
1.237
1.172
1.000
0.978
1.044
1.033
0.947
1.038
0.964
1.108
1.134
1.230
1.118
1.000
0.973
1.020
0.964
0.969
1.041
1.089
1.112
1.166
1.189
1.079
1.000
0.913
1.016
0.964
0.931
0.984
0.946
0.940
0.847
1.046
0.905
1.000
0.988
0.917
0.983
0.926
1.009
1.059
1.059
1.085
1.052
0.971

1.000
0.961
1.030
1.021
0.984
1.132
1.063
0.987
1.010
1.076
0.910
1.000
0.965
1.019
0.950
0.877
0.971
0.993
1.078
1.045
1.146
1.117
1.000
0.999
1.062
1.012
0.954
0.937
0.865
0.813
0.813
1.003
0.819
1.000
1.008
1.050
1.064
1.018
1.172
1.089
0.955
1.034
1.081
0.982
1.000
1.008
1.027
1.052
0.842
0.879
0.884

0.917
0.971
1.043
0.976
1.000
1.048
1.068
1.057
1.017
1.087
1.064
1.022
1.034
1.115
0.977
1.000
1.024
1.077
1.040
1.001
1.105
1.059
1.066
0.996
1.190
1.002
1.000
0.914
0.965
0.903
0.914
0.965
0.965
1.011
0.987
1.053
0.908
1.000
0.943
0.984
0.977
0.946
1.022
1.050
1.070
1.113
1.115
1.074
1.000
0.932
0.983

0.964
0.966
1.035
1.017
1.121
1.176
1.199
1.051
1.000
1.023
1.063
1.055
1.015
1.072
1.107
1.076
1.095
1.234
0.965
1.000
0.962
1.071
0.992
1.034
1.138
1.274
1.182
1.169
1.191
1.120
1.000
0.942
0.927
0.914
0.877
0.958
0.939
0.907
0.963
1.023
0.978
1.000
1.105
1.171
1.152
1.037
1.165
1.146
1.097
1.316
1.499

1.457
1.000
1.072
1.138
1.103
1.097
1.157
1.165
1.163
1.235
1.235
1.167
1.000
1.028
1.075
1.044
1.019
1.082
1.066
1.116
1.163
1.237
1.096
1.000
1.007
1.027
1.015
0.947
1.013
1.077
1.151
1.156
1.216
1.081
1.000
1.019
1.023
1.026
0.984
1.078
1.112
1.163
1.269
1.365
1.267

Enbridge #41

INTERROGATORY

Ref: Input Price Differential

Issue Number:
Issue:

With the same data, namely input prices and quantities used to construct Enbridge's and Union's input quantity indices and growth rates in Table 5, construct annual input price indices and growth rates for both companies, using the GD and COS methods. Provide all data, programming code and spreadsheets.

RESPONSE

This question is subject to several interpretations. We answer with our best guess as to the Company's intent. We report in the attached table labeled "EGD-41 Table" results for implicit input price indexes calculated using the following general formula:

$$\ln(W_t/W_{t-1}) = \ln(C_t/C_{t-1}) - \ln(X_t/X_{t-1}).$$

Here for each year t of the sample period,

W_t = implicit input price index
C_t = index of cost used in the cost share weighting
X_t = Tornqvist input quantity index.

These calculations differ from those in our June report in important respects.

- Results are more sensitive to taxes, and specifically the taxes paid by Enbridge and Union during the sample period. In calculations presented in our June report, taxes affect results only in bolstering the capital cost share.
- Results are sensitive to the pension and other benefit expenses paid by Enbridge and Union during the sample period. In our report, results

Witness: Mark Lowry

are sensitive only to the general trend in these costs as reported by Statistics Canada.

Implicit Input Price Index for Enbridge Gas: COS

	Total Costs Used in Cost Shares of the Input Quantity Index		Input Quantity Index		Implicit Input Price Index	
Year	Level	Growth Rate	Level	Growth Rate	Level	Growth Rate
		[A]		[B]		**C=A-B**
2000	1.000		1.000		1.000	
2001	1.027	2.6%	1.028	2.8%	0.998	-0.18%
2002	1.023	-0.4%	1.021	-0.7%	1.002	0.39%
2003	1.070	4.5%	1.076	5.2%	0.995	-0.71%
2004	1.082	1.1%	1.095	1.8%	0.988	-0.67%
2005	1.084	0.2%	1.112	1.6%	0.975	-1.37%
Average Annual Growth Rate: 2000-2005					-0.51%	

Implicit Input Price Index for Enbridge Gas: Geometric Decay

	Total Costs Used in Cost Shares of the Input Quantity Index		Input Quantity Index		Implicit Input Price Index	
Year	Level	Growth Rate	Level	Growth Rate	Level	Growth Rate
		[A]		[B]		**C=A-B**
2000	1.000		1.000		1.000	
2001	1.107	10.2%	1.029	2.8%	1.076	7.32%
2002	1.112	0.4%	1.023	-0.5%	1.087	0.99%
2003	1.202	7.8%	1.075	4.9%	1.118	2.87%
2004	1.126	-6.5%	1.092	1.6%	1.031	-8.10%
2005	1.087	-3.5%	1.101	0.8%	0.988	-4.34%
Average Annual Growth Rate: 2000-2005					-0.25%	

Implicit Input Price Index for Union Gas: COS

	Total Costs Used in Cost Shares of the Input Quantity Index		Input Quantity Index		Implicit Input Price Index	
Year	Level	Growth Rate	Level	Growth Rate	Level	Growth Rate
		[A]		[B]		**C=A-B**
1999	1.000		1.000		1.000	
2000	1.058	5.7%	0.977	-2.4%	1.084	8.02%
2001	1.061	0.3%	0.981	0.4%	1.082	-0.16%
2002	1.223	14.2%	1.015	3.4%	1.206	10.83%
2003	1.156	-5.7%	1.006	-0.9%	1.149	-4.78%
2004	1.140	-1.4%	0.990	-1.6%	1.152	0.20%
2005	1.157	1.5%	0.979	-1.1%	1.182	2.59%
Average Annual Growth Rate:						
1999-2005					2.78%	
2000-2005					1.74%	

Implicit Input Price Index for Union Gas: Geometric Decay

	Total Costs Used in Cost Shares of the Input Quantity Index		Input Quantity Index		Implicit Input Price Index	
Year	Level	Growth Rate	Level	Growth Rate	Level	Growth Rate
		[A]		[B]		**C=A-B**
1999	1.000		1.000		1.000	
2000	1.040	3.9%	0.980	-2.1%	1.062	5.98%
2001	1.117	7.1%	0.983	0.3%	1.137	6.82%
2002	1.198	7.0%	1.014	3.1%	1.181	3.88%
2003	1.253	4.5%	1.014	0.0%	1.236	4.50%
2004	1.164	-7.4%	0.998	-1.6%	1.167	-5.76%
2005	1.143	-1.8%	0.983	-1.4%	1.163	-0.32%
Average Annual Growth Rate:						
1999-2005					2.52%	
2000-2005					1.82%	

Enbridge #42

INTERROGATORY

Ref: Input Price Differential

Issue Number:
Issue:

Construct an implicit Tornqvist input price index and associated growth rates for both Enbridge and Union using the GD and COS methods. Provide all the data, programming code and spreadsheets. This index is calculated by the following steps; 1) form the ratio of cost in period t to cost in period t-1, using the appropriate input prices and quantities for Enbridge and Union that was used to construct their input quantity indices; 2) divide the ratio by the appropriate (explicit) Tornqvist input quantity index; and 3) calculate the growth rate from the resulting implicit index.

RESPONSE

We report in our answer to question 41 results for implicit Tornqvist input price indexes using the formula we believe to be correct.

Witness: Mark Lowry