UNDERTAKING JTC.1

Tr: 13

DR. LOWRY TO PROVIDE OUTSTANDING INFORMATION FOR PWU QUESTION 3(M), RELATED TO MARCH DATA

RESPONSE:

The ratio of California Peers to Total Peers for EGD are as follows:

- COS Peer Group - June Report 61%
- GD Peer Group - March Report 0%
- GD Peer Group - June Report 63%

WITNESSES:

Mark Lowry

UNDERTAKING JTC.2

Tr: 13

DR. LOWRY TO PROVIDE OUTSTANDING INFORMATION FOR PWU QUESTION 3(N)

RESPONSE:

The ratio of California Peers to Total Peers for Union are as follows:

- COS Peer Group - June Report 56%
- GD Peer Group - March Report 19%
- GD Peer Group - June Report 59%

WITNESSES:

Mark Lowry

UNDERTAKING JTC.4

Tr: 23

DR. LOWRY TO PROVIDE WRITTEN RESPONSE TO SEC QUESTION NO. 4

RESPONSE:

If Enbridge was a demonstrably *inferior* cost performer it would have *more* prospect for accelerated productivity growth under the IR plan. The stretch factor should be adjusted from the level proposed and PEG's incentive power model can be used for this purpose. The attached table, labeled "JTC4 Attachment", provides suggestive results.

We have been making stretch factor recommendations using the incentive power model by taking the difference between the long run average performance gains (rightmost column) for three and six year plan terms (with no earnings sharing) and then dividing the difference by two in order to share the expected benefits. Results are presented in the table for five alternatives to the base assumption in our previous work that the company's initial operating efficiency is 20% from the production frontier. These alternatives are: 40%, 30%, 10%, 5%, and 0% from the frontier. The expected productivity growth of the inefficient company under a specific plan should be compared with the expected productivity growth of the sampled utilities. We assume that these typically operated with a three year regulatory lag and had 20% initial operating efficiency.

It can be seen that the difference in long run performance gains under these scenarios is modest. For example, the indicated stretch factor for 40% inefficiency is 0.55% [(2.11-1.01)/2] instead of 0.44 [(1.88-1.01)/2] for 20% inefficiency.

WITNESSES:

Mark Lowry

Incentive Power Results - JTC4 Attachment

Initial inefficiency = 40%	Average Annual Performance Gain			
	1st Rate Cycle	2nd rate cycle	3rd rate cycle	Long run
Reference Regulatory Options				
2 Year Cost of Service	0.65%	0.79%	0.71%	0.81%
3 Year Cost of Service	1.28%	1.15%	1.21%	1.11%
Full Rate Externalization	7.03%	5.24%	4.89%	4.93%
Impact of Plan Term				
Term = 3 years	1.28%	1.15%	1.21%	1.11%
Term = 6 years	1.89%	1.90%	1.94%	**2.11%**
Impact of Earnings Sharing				
3-year plans, ESM				
No Sharing	1.28%	1.15%	1.21%	1.11%
Company Share = 75%	0.95%	0.92%	1.01%	0.93%
Company Share = 50%	0.78%	0.78%	0.82%	0.78%
Company Share = 25%	0.60%	0.69%	0.75%	0.63%
6-year plans, ESM				
No Sharing	1.89%	1.90%	1.94%	2.11%
Company Share = 75%	1.71%	1.74%	1.80%	1.77%
Company Share = 50%	1.38%	1.47%	1.49%	1.52%
Company Share = 25%	1.16%	1.22%	1.24%	1.26%
Impact of Partial Plan Update Externalization				
3-Year Plans, Extern				
Externalized Percentage = 0%	1.28%	1.15%	1.21%	1.11%
Externalized Percentage = 10%	3.29%	2.80%	2.88%	3.04%
Externalized Percentage = 25%	4.98%	4.02%	4.01%	3.97%
Externalized Percentage = 50%	7.37%	4.90%	4.74%	4.52%
6-Year Plans, Extern				
Externalized Percentage = 0%	1.89%	1.90%	1.94%	2.11%
Externalized Percentage = 10%	2.66%	2.52%	2.60%	2.74%
Externalized Percentage = 25%	3.74%	3.50%	3.54%	3.55%
Externalized Percentage = 50%	6.21%	4.73%	4.45%	4.61%

Initial inefficiency = 30%	Average Annual Performance Gain			
	1st Rate Cycle	2nd rate cycle	3rd rate cycle	Long run
Reference Regulatory Options				
2 Year Cost of Service	0.57%	0.66%	0.68%	0.75%
3 Year Cost of Service	1.05%	1.03%	1.13%	1.07%
Full Rate Externalization	6.35%	4.95%	4.63%	4.74%
Impact of Plan Term				
Term = 3 years	1.05%	1.03%	1.13%	1.07%
Term = 6 years	1.84%	1.94%	2.04%	**2.06%**
Impact of Earnings Sharing				

3-year plans, ESM				
No Sharing	1.05%	1.03%	1.13%	1.07%
Company Share = 75%	0.80%	0.80%	0.92%	0.88%
Company Share = 50%	0.63%	0.71%	0.76%	0.77%
Company Share = 25%	0.51%	0.65%	0.61%	0.61%
6-year plans, ESM				
No Sharing	1.84%	1.94%	2.04%	2.06%
Company Share = 75%	1.48%	1.60%	1.75%	1.69%
Company Share = 50%	1.17%	1.33%	1.42%	1.45%
Company Share = 25%	1.04%	1.10%	1.18%	1.20%
Impact of Partial Plan Update Externalization				
3-Year Plans, Extern				
Externalized Percentage = 0%	1.05%	1.03%	1.13%	1.07%
Externalized Percentage = 10%	2.78%	2.56%	2.65%	2.94%
Externalized Percentage = 25%	4.44%	3.67%	3.65%	3.81%
Externalized Percentage = 50%	6.64%	4.45%	4.45%	4.33%
6-Year Plans, Extern				
Externalized Percentage = 0%	1.84%	1.94%	2.04%	2.06%
Externalized Percentage = 10%	2.32%	2.33%	2.44%	2.59%
Externalized Percentage = 25%	3.30%	3.26%	3.32%	3.41%
Externalized Percentage = 50%	5.62%	4.42%	4.26%	4.40%

Initial inefficiency = 20%	**Average Annual Performance Gain**			
	1st Rate Cycle	2nd rate cycle	3rd rate cycle	Long run
Reference Regulatory Options				
2 Year Cost of Service	0.41%	0.44%	0.54%	0.70%
3 Year Cost of Service	0.85%	0.91%	0.98%	1.01%
Full Rate Externalization	5.63%	4.58%	4.45%	4.48%
Impact of Plan Term				
Term = 3 years	0.85%	0.91%	0.98%	**1.01%**
Term = 6 years	1.52%	1.55%	1.72%	**1.88%**
Term = 10 years	2.05%	2.41%	2.73%	2.53%
Impact of Earnings Sharing				
3-year plans, ESM				
No Sharing	0.85%	0.91%	0.98%	1.01%
Company Share = 75%	0.66%	0.70%	0.74%	0.86%
Company Share = 50%	0.53%	0.57%	0.64%	0.72%
Company Share = 25%	0.37%	0.46%	0.55%	0.59%
6-year plans, ESM				
No Sharing	1.52%	1.55%	1.72%	1.88%
Company Share = 75%	1.24%	1.45%	1.58%	1.57%
Company Share = 50%	0.98%	1.16%	1.33%	1.36%
Company Share = 25%	0.92%	0.97%	1.09%	1.12%
Impact of Partial Plan Update Externalization				
3-Year Plans, Extern				
Externalized Percentage = 0%	0.85%	0.91%	0.98%	1.01%

Externalized Percentage = 10%	2.30%	2.27%	2.35%	2.77%
Externalized Percentage = 25%	3.84%	3.30%	3.35%	3.61%
Externalized Percentage = 50%	5.82%	4.03%	3.98%	4.11%
6-Year Plans, Extern				
Externalized Percentage = 0%	1.52%	1.55%	1.72%	1.88%
Externalized Percentage = 10%	1.90%	2.10%	2.29%	2.42%
Externalized Percentage = 25%	2.83%	2.96%	3.10%	3.26%
Externalized Percentage = 50%	4.14%	3.85%	3.89%	3.95%

Initial inefficiency = 10%	**Average Annual Performance Gain**			
	1st Rate Cycle	2nd rate cycle	3rd rate cycle	Long run
Reference Regulatory Options				
2 Year Cost of Service	0.30%	0.32%	0.36%	0.66%
3 Year Cost of Service	0.64%	0.79%	0.87%	0.94%
Full Rate Externalization	4.72%	4.16%	4.13%	4.20%
Impact of Plan Term				
Term = 3 years	0.64%	0.79%	0.87%	0.94%
Term = 6 years	1.24%	1.40%	1.62%	**1.78%**
Impact of Earnings Sharing				
3-year plans, ESM				
No Sharing	0.64%	0.79%	0.87%	0.94%
Company Share = 75%	0.43%	0.63%	0.70%	0.81%
Company Share = 50%	0.34%	0.47%	0.56%	0.67%
Company Share = 25%	0.20%	0.37%	0.46%	0.55%
6-year plans, ESM				
No Sharing	1.24%	1.40%	1.62%	1.78%
Company Share = 75%	1.00%	1.28%	1.52%	1.49%
Company Share = 50%	0.78%	1.03%	1.23%	1.28%
Company Share = 25%	0.87%	1.02%	1.01%	1.11%
Impact of Partial Plan Update Externalization				
3-Year Plans, Extern				
Externalized Percentage = 0%	0.64%	0.79%	0.87%	0.94%
Externalized Percentage = 10%	1.83%	2.01%	2.19%	2.65%
Externalized Percentage = 25%	3.16%	2.82%	2.96%	3.42%
Externalized Percentage = 50%	4.78%	3.48%	3.56%	3.85%
6-Year Plans, Extern				
Externalized Percentage = 0%	1.24%	1.40%	1.62%	1.78%
Externalized Percentage = 10%	1.43%	1.83%	2.16%	2.27%
Externalized Percentage = 25%	3.14%	2.95%	3.24%	3.44%
Externalized Percentage = 50%	4.37%	3.10%	3.48%	3.73%

Initial inefficiency = 5%	**Average Annual Performance Gain**			
	1st Rate Cycle	2nd rate cycle	3rd rate cycle	Long run
Reference Regulatory Options				
2 Year Cost of Service	0.28%	0.24%	0.32%	0.64%
3 Year Cost of Service	0.37%	0.86%	1.11%	0.93%

Full Rate Externalization	4.24%	3.90%	3.96%	4.05%
Impact of Plan Term				
Term = 3 years	0.37%	0.86%	1.11%	**0.93%**
Term = 6 years	1.10%	1.33%	1.47%	**1.71%**
Impact of Earnings Sharing				
3-year plans, ESM				
No Sharing	0.37%	0.86%	1.11%	0.93%
Company Share = 75%	0.39%	0.50%	0.66%	0.78%
Company Share = 50%	0.19%	0.46%	0.51%	0.64%
Company Share = 25%	0.17%	0.26%	0.42%	0.55%
6-year plans, ESM				
No Sharing	1.10%	1.33%	1.47%	1.71%
Company Share = 75%	0.86%	1.18%	1.41%	1.44%
Company Share = 50%	0.81%	0.94%	1.15%	1.23%
Company Share = 25%	0.70%	0.78%	0.94%	1.04%
Impact of Partial Plan Update Externalization				
3-Year Plans, Extern				
Externalized Percentage = 0%	0.37%	0.86%	1.11%	0.93%
Externalized Percentage = 10%	1.62%	1.84%	2.07%	2.57%
Externalized Percentage = 25%	2.76%	2.61%	2.76%	3.30%
Externalized Percentage = 50%	4.27%	3.17%	3.33%	3.77%
6-Year Plans, Extern				
Externalized Percentage = 0%	1.10%	1.33%	1.47%	1.71%
Externalized Percentage = 10%	1.21%	1.70%	2.03%	2.17%
Externalized Percentage = 25%	2.79%	2.79%	3.13%	3.34%
Externalized Percentage = 50%	3.81%	3.51%	3.69%	3.85%

Initial inefficiency = 0%	**Average Annual Performance Gain**			
	1st Rate Cycle	2nd rate cycle	3rd rate cycle	Long run
Reference Regulatory Options				
2 Year Cost of Service	0.23%	0.24%	0.21%	0.61%
3 Year Cost of Service	0.37%	0.62%	0.75%	0.91%
Full Rate Externalization	3.78%	3.64%	3.82%	3.93%
Impact of Plan Term				
Term = 3 years	0.37%	0.62%	0.75%	**0.91%**
Term = 6 years	0.96%	1.23%	1.40%	**1.66%**
Impact of Earnings Sharing				
3-year plans, ESM				
No Sharing	0.37%	0.62%	0.75%	0.91%
Company Share = 75%	0.28%	0.42%	0.55%	0.76%
Company Share = 50%	0.15%	0.36%	0.47%	0.62%
Company Share = 25%	0.11%	0.20%	0.39%	0.53%
6-year plans, ESM				
No Sharing	0.96%	1.23%	1.40%	1.66%
Company Share = 75%	0.68%	1.10%	1.35%	1.39%

Company Share = 50%	0.60%	0.84%	1.14%	**1.20%**
Company Share = 25%	0.58%	0.72%	0.95%	0.99%

Impact of Partial Plan Update Externalization

3-Year Plans, Extern				
Externalized Percentage = 0%	0.37%	0.62%	0.75%	0.91%
Externalized Percentage = 10%	1.40%	1.68%	1.91%	2.47%
Externalized Percentage = 25%	2.44%	2.30%	2.61%	3.16%
Externalized Percentage = 50%	3.75%	2.84%	3.13%	3.64%
6-Year Plans, Extern				
Externalized Percentage = 0%	0.96%	1.23%	1.40%	1.66%
Externalized Percentage = 10%	1.02%	1.54%	1.83%	2.08%
Externalized Percentage = 25%	2.42%	2.60%	3.04%	3.21%
Externalized Percentage = 50%	3.40%	3.28%	3.57%	3.69%

UNDERTAKING JTC.5

Tr: 38

DR. LOWRY TO PROVIDE WRITTEN RESPONSE TO ENBRIDGE QUESTION NO. 17

RESPONSE:

a) Yes.

b) PEG will provide the revised report before the ADR process.

WITNESSES:

Mark Lowry

UNDERTAKING JTC.6

Tr: 38

DR. LOWRY TO PROVIDE WRITTEN RESPONSE TO ENBRIDGE QUESTION NO. 18

RESPONSE:

a) The 0.72% figure is correct. There is no need to revise table 10 since there was no error in its calculation.

b) i. Yes.

ii. Yes, since these negative values are close to zero.

WITNESSES:

Mark Lowry

UNDERTAKING JTC.7

Tr: 38

DR. LOWRY TO PROVIDE WRITTEN RESPONSE TO ENBRIDGE QUESTION NO. 19

RESPONSE:

a) Yes

b) Yes

c) No. We calculated the expected scale economies based on the best available estimates of long run trends. For the U.S. this period was 1994-2004. For Enbridge this period was 2000-2005.

WITNESSES:

Mark Lowry

UNDERTAKING JTC.8

Tr: 38

DR. LOWRY TO PROVIDE WRITTEN RESPONSE TO ENBRIDGE QUESTION NO. 20

RESPONSE:

a) Yes, the output elasticities for the 'full translog' models are computed as $\partial \ln C / \partial \ln Y_i$ for each year, which are then averaged over 1994-2004 for each company, in response to interrogatories #14 and #15. It turns out, however, that we sent the incorrect computations in response to these two questions. The correct average elasticities are provided in the files "JTC 8 CS model.txt" and "JTC 8 GD model.txt." In addition, the year by year values for these are provided in "JTC 8 details.xls."

b)

i. Although it is not always necessary to have trend interaction terms in a full translog model, it is true that we did not include output and trend interaction terms in ours.

ii. The estimates related to the 'complete' translog models are provided in "JTC 8b ii CS model.txt" and "JTC 8b ii GD model.txt." The elasticities from these two models are provided in "JTC 8b ii elasticities.xls." Please note that, for both capital cost specifications, only one of the five trend interaction terms has a statistically significant parameter estimate. The one significant variable does not pertain to output.

c)

i. We provide EGDI's elasticities in "JTC 8c i & ii EGDI elasticities.xls." The first set of elasticities is that presented in response to Enbridge's interrogatories #14 and # 15. It indicates that the sums are below 0.4. The corrected elasticities have sums that are about 0.65. It is true that we did *not* treat the elasticities of the residential and commercial deliveries as zero when computing these sums.

ii. While these elasticities sum over 0.9 if the residential and commercial deliveries are set to zero, it would be incorrect to do so since these negative elasticity values are large and are likely to be statistically significantly different from zero. PEG set these elasticities for EGD under the COS capital costing method in Table 10 of its June 20 report to zero since they were very low, less than 0.09 in absolute value terms, and were **not** likely to be statistically significantly different from zero. In fact, when PEG dropped the output interaction terms in model estimation, the few resulting negative elasticities were small in magnitude and could be treated as being statistically **not** significantly different from zero.

WITNESSES:

Mark Lowry

JTC 8 details.xls
CS model

Firm-ID	year	yn	yvrc	yvoth	sumY	WL	WK
1	1994	0.426	0.468	0.097	0.991	0.268	0.572
1	1995	0.441	0.432	0.104	0.977	0.273	0.567
1	1996	0.435	0.419	0.114	0.969	0.264	0.583
1	1997	0.457	0.398	0.108	0.964	0.266	0.576
1	1998	0.399	0.490	0.111	1.000	0.268	0.569
1	1999	0.413	0.477	0.106	0.996	0.260	0.580
1	2000	0.390	0.529	0.100	1.018	0.258	0.577
1	2001	0.457	0.464	0.078	0.998	0.245	0.586
1	2002	0.418	0.522	0.082	1.022	0.249	0.574
1	2003	0.433	0.499	0.080	1.011	0.231	0.597
1	2004	0.447	0.502	0.070	1.019	0.243	0.570
2	1994	0.742	0.075	0.053	0.870	0.285	0.516
2	1995	0.788	0.009	0.050	0.847	0.282	0.519
2	1996	0.755	0.043	0.059	0.857	0.270	0.540
2	1997	0.747	0.077	0.050	0.874	0.277	0.528
2	1998	0.687	0.133	0.072	0.892	0.279	0.524
2	1999	0.693	0.208	0.031	0.932	0.278	0.517
2	2000	0.808	-0.014	0.047	0.842	0.256	0.541
2	2001	0.815	0.058	0.007	0.881	0.257	0.529
2	2002	0.805	0.053	0.018	0.876	0.246	0.539
2	2003	0.825	0.031	0.011	0.868	0.231	0.556
2	2004	0.891	-0.022	-0.009	0.860	0.257	0.503
3	1994	0.596	0.268	0.066	0.930	0.280	0.526
3	1995	0.595	0.266	0.068	0.928	0.275	0.536
3	1996	0.571	0.295	0.071	0.937	0.264	0.557
3	1997	0.508	0.371	0.086	0.965	0.276	0.547
3	1998	0.664	0.244	0.025	0.932	0.261	0.541
3	1999	0.661	0.211	0.042	0.914	0.246	0.566
3	2000	0.674	0.204	0.036	0.913	0.241	0.566
3	2001	0.741	0.198	-0.015	0.925	0.236	0.557
3	2002	0.791	0.103	-0.007	0.886	0.217	0.571
3	2003	0.879	0.016	-0.036	0.859	0.196	0.583
3	2004	0.881	0.024	-0.037	0.868	0.214	0.549
6	1994	-0.006	0.731	0.300	1.024	0.282	0.624
6	1995	-0.009	0.752	0.293	1.035	0.284	0.623
6	1996	-0.039	0.777	0.304	1.043	0.278	0.634
6	1997	0.011	0.749	0.280	1.040	0.281	0.621
6	1998	0.004	0.747	0.289	1.039	0.272	0.621
6	1999	-0.018	0.723	0.316	1.021	0.254	0.652
6	2000	-0.080	0.812	0.318	1.050	0.221	0.696
6	2001	-0.036	0.773	0.307	1.044	0.238	0.658
6	2002	0.047	0.739	0.259	1.044	0.222	0.653
6	2003	0.048	0.749	0.253	1.051	0.215	0.650
6	2004	0.089	0.718	0.238	1.046	0.216	0.636
7	1994	0.200	0.713	0.133	1.045	0.240	0.629
7	1995	0.109	0.771	0.178	1.057	0.247	0.634
7	1996	0.242	0.668	0.122	1.031	0.231	0.642
7	1997	0.129	0.745	0.174	1.048	0.237	0.652
7	1998	0.120	0.783	0.165	1.068	0.242	0.636
7	1999	0.103	0.769	0.185	1.056	0.230	0.658

7	2000	0.221	0.681	0.135	1.036	0.221	0.648
7	2001	0.296	0.656	0.086	1.039	0.208	0.651
7	2002	0.239	0.700	0.112	1.051	0.206	0.651
7	2003	0.409	0.553	0.047	1.010	0.182	0.655
7	2004	0.436	0.535	0.038	1.010	0.192	0.630
9	1994	0.564	0.311	0.059	0.933	0.256	0.565
9	1995	0.517	0.379	0.063	0.958	0.253	0.575
9	1996	0.605	0.232	0.063	0.899	0.234	0.599
9	1997	0.643	0.203	0.047	0.894	0.234	0.596
9	1998	0.597	0.286	0.045	0.928	0.238	0.584
9	1999	0.766	0.166	-0.031	0.901	0.219	0.587
9	2000	0.698	0.170	0.020	0.887	0.204	0.618
9	2001	0.813	0.135	-0.054	0.894	0.200	0.600
9	2002	0.736	0.157	-0.003	0.891	0.195	0.609
9	2003	0.654	0.180	0.050	0.883	0.177	0.644
9	2004	0.697	0.164	0.028	0.889	0.198	0.599
10	1994	0.447	0.471	0.068	0.986	0.257	0.573
10	1995	0.497	0.432	0.048	0.977	0.251	0.576
10	1996	0.474	0.433	0.065	0.972	0.244	0.594
10	1997	0.553	0.407	0.016	0.976	0.246	0.578
10	1998	0.650	0.377	-0.044	0.983	0.246	0.553
10	1999	0.643	0.356	-0.033	0.965	0.206	0.614
10	2000	0.685	0.323	-0.047	0.961	0.216	0.587
10	2001	0.739	0.320	-0.087	0.971	0.215	0.576
10	2002	0.269	0.552	0.173	0.994	0.229	0.624
10	2003	0.324	0.500	0.153	0.978	0.207	0.642
10	2004	0.232	0.541	0.210	0.982	0.221	0.631
11	1994	0.470	0.231	0.164	0.865	0.234	0.625
11	1995	0.390	0.279	0.204	0.872	0.232	0.642
11	1996	0.366	0.298	0.212	0.876	0.220	0.665
11	1997	0.627	0.153	0.075	0.856	0.206	0.645
11	1998	0.652	0.137	0.066	0.854	0.206	0.634
11	1999	0.829	0.008	-0.013	0.824	0.186	0.636
11	2000	0.852	0.010	-0.032	0.830	0.179	0.636
11	2001	0.892	0.028	-0.072	0.848	0.177	0.627
11	2002	0.877	0.097	-0.092	0.882	0.179	0.608
11	2003	0.811	0.177	-0.079	0.909	0.167	0.625
11	2004	0.841	0.217	-0.120	0.938	0.178	0.593
12	1994	0.601	0.188	0.096	0.885	0.209	0.639
12	1995	0.561	0.209	0.119	0.888	0.213	0.641
12	1996	0.666	0.117	0.079	0.862	0.197	0.653
12	1997	0.649	0.031	0.134	0.814	0.189	0.678
12	1998	0.698	-0.034	0.127	0.791	0.180	0.680
12	1999	0.834	-0.206	0.102	0.730	0.159	0.697
12	2000	1.085	-0.375	-0.014	0.696	0.145	0.673
12	2001	1.145	-0.392	-0.052	0.700	0.136	0.673
12	2002	1.046	-0.351	0.006	0.701	0.130	0.688
12	2003	1.027	-0.264	-0.021	0.742	0.126	0.681
12	2004	0.817	-0.110	0.073	0.780	0.148	0.675
13	1994	0.789	-0.203	0.148	0.734	0.238	0.588
13	1995	0.826	-0.237	0.136	0.725	0.234	0.592

13	1996	0.799	-0.237	0.158	0.719	0.231	0.603
13	1997	0.808	-0.215	0.140	0.734	0.233	0.593
13	1998	0.824	-0.167	0.107	0.764	0.236	0.571
13	1999	0.814	-0.185	0.122	0.751	0.223	0.597
13	2000	0.823	-0.213	0.131	0.740	0.222	0.589
13	2001	0.877	-0.213	0.088	0.752	0.219	0.581
13	2002	0.897	-0.244	0.087	0.740	0.201	0.593
13	2003	0.915	-0.273	0.087	0.729	0.184	0.602
13	2004	0.907	-0.244	0.084	0.747	0.211	0.559
15	1994	0.773	-0.154	0.127	0.745	0.190	0.657
15	1995	0.787	-0.182	0.131	0.736	0.197	0.651
15	1996	0.826	-0.190	0.107	0.743	0.207	0.628
15	1997	0.806	-0.182	0.118	0.741	0.190	0.655
15	1998	0.794	-0.130	0.106	0.770	0.211	0.612
15	1999	0.779	-0.125	0.113	0.767	0.193	0.643
15	2000	0.811	-0.161	0.105	0.755	0.174	0.658
15	2001	0.831	-0.124	0.072	0.779	0.181	0.640
15	2002	0.821	-0.127	0.081	0.775	0.164	0.654
15	2003	0.791	-0.139	0.110	0.762	0.145	0.674
15	2004	0.842	-0.142	0.076	0.776	0.173	0.621
17	1994	0.599	0.259	0.063	0.920	0.263	0.547
17	1995	0.535	0.310	0.089	0.935	0.270	0.551
17	1996	0.595	0.191	0.098	0.883	0.244	0.586
17	1997	0.538	0.304	0.089	0.931	0.251	0.576
17	1998	0.530	0.362	0.068	0.961	0.252	0.561
17	1999	0.533	0.347	0.073	0.953	0.246	0.573
17	2000	0.550	0.328	0.070	0.948	0.240	0.570
17	2001	0.549	0.350	0.060	0.959	0.233	0.578
17	2002	0.569	0.332	0.053	0.954	0.223	0.577
17	2003	0.581	0.302	0.056	0.940	0.199	0.598
17	2004	0.598	0.342	0.027	0.967	0.211	0.570
21	1994	0.591	0.015	0.184	0.791	0.223	0.636
21	1995	0.461	0.080	0.257	0.798	0.229	0.651
21	1996	0.516	0.027	0.239	0.782	0.223	0.655
21	1997	0.519	0.006	0.247	0.772	0.221	0.661
21	1998	0.547	0.047	0.207	0.801	0.223	0.641
21	1999	0.551	0.016	0.218	0.785	0.212	0.658
21	2000	0.573	-0.010	0.216	0.778	0.211	0.651
21	2001	0.599	0.004	0.189	0.792	0.215	0.636
21	2002	0.541	0.135	0.173	0.849	0.217	0.622
21	2003	0.633	0.064	0.132	0.829	0.185	0.648
21	2004	0.671	0.065	0.105	0.840	0.196	0.618
22	1994	0.513	0.283	0.101	0.897	0.216	0.633
22	1995	0.654	0.177	0.043	0.873	0.214	0.619
22	1996	0.573	0.213	0.088	0.874	0.206	0.646
22	1997	0.609	0.216	0.059	0.885	0.207	0.634
22	1998	0.607	0.278	0.033	0.919	0.213	0.610
22	1999	0.628	0.237	0.035	0.900	0.197	0.635
22	2000	0.654	0.212	0.028	0.894	0.191	0.630
22	2001	0.651	0.267	0.003	0.922	0.186	0.633
22	2002	0.650	0.225	0.025	0.899	0.172	0.645

22	2003	0.650	0.200	0.036	0.886	0.150	0.665
22	2004	0.657	0.214	0.027	0.898	0.165	0.638
23	1994	0.853	-0.306	0.146	0.693	0.212	0.622
23	1995	0.874	-0.330	0.143	0.687	0.216	0.618
23	1996	0.878	-0.355	0.151	0.674	0.204	0.637
23	1997	0.821	-0.304	0.172	0.689	0.206	0.639
23	1998	0.793	-0.230	0.161	0.724	0.216	0.614
23	1999	0.829	-0.267	0.149	0.711	0.201	0.634
23	2000	0.811	-0.284	0.174	0.701	0.203	0.626
23	2001	0.896	-0.284	0.105	0.717	0.184	0.636
23	2002	0.897	-0.321	0.122	0.699	0.172	0.643
23	2003	0.949	-0.349	0.095	0.694	0.151	0.651
23	2004	0.931	-0.327	0.101	0.705	0.166	0.629
24	1994	0.396	0.421	0.141	0.959	0.267	0.588
24	1995	0.424	0.410	0.126	0.961	0.273	0.578
24	1996	0.434	0.391	0.128	0.953	0.263	0.592
24	1997	0.457	0.371	0.122	0.950	0.269	0.578
24	1998	0.438	0.375	0.136	0.949	0.261	0.579
24	1999	0.464	0.346	0.129	0.939	0.245	0.596
24	2000	0.435	0.379	0.137	0.951	0.237	0.601
24	2001	0.437	0.389	0.131	0.957	0.231	0.601
24	2002	0.542	0.340	0.072	0.954	0.214	0.596
24	2003	0.568	0.365	0.042	0.974	0.209	0.583
24	2004	0.567	0.326	0.063	0.955	0.209	0.580
26	1994	0.199	0.516	0.235	0.949	0.231	0.662
26	1995	0.150	0.532	0.266	0.949	0.233	0.669
26	1996	0.313	0.459	0.171	0.943	0.212	0.673
26	1997	0.232	0.513	0.212	0.956	0.229	0.663
26	1998	0.107	0.630	0.256	0.993	0.240	0.656
26	1999	0.304	0.365	0.227	0.896	0.209	0.684
26	2000	0.548	0.308	0.063	0.920	0.206	0.634
26	2001	0.585	0.322	0.028	0.934	0.202	0.629
26	2002	0.662	0.261	0.000	0.923	0.209	0.595
26	2003	0.645	0.250	0.014	0.909	0.166	0.656
26	2004	0.683	0.227	0.000	0.910	0.187	0.613
27	1994	0.707	-0.055	0.149	0.802	0.256	0.582
27	1995	0.727	-0.070	0.142	0.799	0.257	0.582
27	1996	0.698	-0.005	0.136	0.829	0.271	0.560
27	1997	0.738	-0.054	0.126	0.810	0.252	0.582
27	1998	0.816	-0.135	0.106	0.787	0.244	0.570
27	1999	0.758	-0.045	0.107	0.820	0.239	0.580
27	2000	0.710	-0.008	0.128	0.829	0.229	0.590
27	2001	0.691	0.039	0.121	0.851	0.229	0.583
27	2002	0.757	-0.017	0.096	0.837	0.215	0.582
27	2003	0.796	-0.078	0.097	0.814	0.207	0.579
27	2004	0.754	-0.019	0.104	0.840	0.225	0.548
28	1994	0.555	0.224	0.112	0.891	0.252	0.581
28	1995	0.522	0.245	0.129	0.896	0.254	0.585
28	1996	0.645	0.160	0.072	0.877	0.237	0.593
28	1997	0.626	0.216	0.061	0.903	0.244	0.583
28	1998	0.705	0.183	0.016	0.905	0.245	0.561

28	1999	0.673	0.175	0.043	0.891	0.217	0.609
28	2000	0.677	0.147	0.055	0.879	0.221	0.599
28	2001	0.677	0.205	0.030	0.912	0.236	0.570
28	2002	0.658	0.216	0.040	0.914	0.228	0.573
28	2003	0.716	0.150	0.027	0.892	0.212	0.583
28	2004	0.736	0.147	0.018	0.900	0.236	0.537
29	1994	0.859	-0.264	0.110	0.705	0.184	0.658
29	1995	1.014	-0.384	0.046	0.676	0.182	0.642
29	1996	0.881	-0.318	0.119	0.681	0.175	0.675
29	1997	0.937	-0.312	0.074	0.698	0.183	0.649
29	1998	0.923	-0.249	0.057	0.731	0.195	0.619
29	1999	0.924	-0.267	0.063	0.720	0.176	0.650
29	2000	0.957	-0.297	0.051	0.710	0.159	0.660
29	2001	0.974	-0.248	0.014	0.739	0.157	0.655
29	2002	0.913	-0.262	0.070	0.721	0.156	0.658
29	2003	0.915	-0.281	0.076	0.710	0.131	0.681
29	2004	1.058	-0.323	-0.014	0.721	0.140	0.639
30	1994	0.633	0.180	0.069	0.881	0.235	0.594
30	1995	0.646	0.169	0.066	0.881	0.244	0.579
30	1996	0.633	0.164	0.077	0.873	0.228	0.609
30	1997	0.778	0.105	-0.009	0.875	0.227	0.586
30	1998	0.908	0.099	-0.106	0.901	0.230	0.547
30	1999	0.819	0.119	-0.045	0.893	0.230	0.564
30	2000	0.772	0.148	-0.019	0.900	0.236	0.556
30	2001	0.909	0.076	-0.093	0.893	0.229	0.542
30	2002	0.738	0.164	-0.001	0.902	0.221	0.570
30	2003	0.702	0.156	0.031	0.890	0.209	0.589
30	2004	0.707	0.167	0.026	0.901	0.228	0.552
31	1994	0.402	0.359	0.158	0.919	0.259	0.591
31	1995	0.396	0.382	0.152	0.931	0.261	0.589
31	1996	0.400	0.347	0.166	0.913	0.252	0.606
31	1997	0.387	0.373	0.164	0.924	0.252	0.608
31	1998	0.369	0.424	0.156	0.949	0.259	0.591
31	1999	0.360	0.415	0.166	0.941	0.243	0.616
31	2000	0.388	0.376	0.165	0.929	0.248	0.601
31	2001	0.422	0.366	0.147	0.935	0.269	0.560
31	2002	0.390	0.391	0.161	0.942	0.257	0.571
31	2003	0.415	0.346	0.162	0.923	0.239	0.589
31	2004	0.442	0.351	0.142	0.935	0.256	0.551
34	1994	0.785	-0.168	0.128	0.745	0.197	0.651
34	1995	0.732	-0.100	0.138	0.770	0.203	0.648
34	1996	0.795	-0.187	0.130	0.738	0.192	0.660
34	1997	0.818	-0.227	0.131	0.722	0.187	0.669
34	1998	0.852	-0.211	0.103	0.744	0.222	0.602
34	1999	0.812	-0.226	0.141	0.727	0.207	0.632
34	2000	0.857	-0.211	0.099	0.746	0.208	0.613
34	2001	0.850	-0.161	0.082	0.771	0.211	0.605
34	2002	0.852	-0.182	0.089	0.760	0.192	0.621
34	2003	0.866	-0.228	0.100	0.738	0.174	0.642
34	2004	1.008	-0.313	0.032	0.727	0.178	0.607
36	1994	0.443	0.490	0.073	1.005	0.296	0.524

36	1995	0.442	0.493	0.071	1.007	0.292	0.533
36	1996	0.453	0.436	0.090	0.980	0.281	0.552
36	1997	0.432	0.519	0.069	1.020	0.292	0.531
36	1998	0.451	0.530	0.052	1.032	0.295	0.513
36	1999	0.452	0.524	0.053	1.029	0.284	0.530
36	2000	0.524	0.385	0.064	0.974	0.272	0.540
36	2001	0.518	0.492	0.021	1.030	0.288	0.506
36	2002	0.523	0.450	0.037	1.010	0.279	0.512
36	2003	0.559	0.409	0.028	0.995	0.261	0.533
36	2004	0.581	0.404	0.018	1.003	0.286	0.486
37	1994	0.715	0.204	-0.010	0.909	0.233	0.576
37	1995	0.686	0.232	0.000	0.917	0.231	0.585
37	1996	0.695	0.193	0.010	0.899	0.220	0.603
37	1997	0.715	0.195	-0.004	0.905	0.229	0.588
37	1998	0.694	0.270	-0.022	0.942	0.238	0.565
37	1999	0.674	0.251	0.001	0.926	0.218	0.601
37	2000	0.706	0.201	0.001	0.907	0.212	0.602
37	2001	0.721	0.235	-0.028	0.929	0.212	0.593
37	2002	0.752	0.192	-0.028	0.916	0.214	0.574
37	2003	0.753	0.175	-0.024	0.904	0.179	0.620
37	2004	0.778	0.167	-0.035	0.909	0.201	0.577
38	1994	0.435	0.606	0.026	1.067	0.271	0.557
38	1995	0.457	0.576	0.026	1.059	0.286	0.536
38	1996	0.444	0.594	0.028	1.067	0.285	0.537
38	1997	0.442	0.584	0.036	1.062	0.286	0.536
38	1998	0.432	0.581	0.046	1.059	0.276	0.539
38	1999	0.477	0.537	0.032	1.046	0.264	0.547
38	2000	0.419	0.590	0.053	1.061	0.258	0.555
38	2001	0.436	0.591	0.039	1.066	0.250	0.555
38	2002	0.504	0.547	0.008	1.059	0.244	0.540
38	2003	0.498	0.557	0.007	1.062	0.224	0.558
38	2004	0.514	0.512	0.022	1.047	0.245	0.521
40	1994	0.727	-0.020	0.118	0.825	0.247	0.588
40	1995	0.773	-0.040	0.094	0.827	0.260	0.565
40	1996	0.772	-0.023	0.086	0.835	0.255	0.570
40	1997	0.769	-0.024	0.089	0.835	0.253	0.572
40	1998	0.791	-0.048	0.086	0.829	0.248	0.563
40	1999	0.766	-0.022	0.091	0.836	0.233	0.584
40	2000	0.712	0.026	0.111	0.850	0.228	0.589
40	2001	0.704	0.044	0.110	0.858	0.223	0.589
40	2002	0.742	0.039	0.082	0.863	0.209	0.589
40	2003	0.759	0.047	0.066	0.872	0.203	0.582
40	2004	0.780	0.014	0.068	0.861	0.206	0.569
41	1994	0.586	0.314	0.058	0.958	0.299	0.510
41	1995	0.599	0.308	0.054	0.961	0.318	0.484
41	1996	0.632	0.288	0.037	0.958	0.306	0.494
41	1997	0.650	0.277	0.030	0.958	0.308	0.486
41	1998	0.667	0.244	0.034	0.945	0.297	0.488
41	1999	0.651	0.253	0.042	0.945	0.283	0.509
41	2000	0.624	0.259	0.063	0.946	0.284	0.503
41	2001	0.615	0.316	0.041	0.972	0.268	0.516

41	2002	0.636	0.264	0.050	0.949	0.248	0.532
41	2003	0.666	0.246	0.036	0.947	0.237	0.531
41	2004	0.728	0.210	0.010	0.948	0.262	0.477
42	1994	0.924	-0.125	-0.005	0.794	0.237	0.565
42	1995	1.074	-0.238	-0.069	0.767	0.225	0.564
42	1996	1.199	-0.306	-0.134	0.758	0.211	0.564
42	1997	1.265	-0.351	-0.164	0.750	0.209	0.556
42	1998	1.339	-0.354	-0.219	0.766	0.211	0.528
42	1999	1.109	-0.228	-0.098	0.783	0.211	0.566
42	2000	0.993	-0.177	-0.032	0.785	0.207	0.588
42	2001	1.143	-0.267	-0.104	0.772	0.203	0.568
42	2002	1.101	-0.233	-0.087	0.781	0.198	0.571
42	2003	1.340	-0.362	-0.215	0.762	0.167	0.575
42	2004	1.473	-0.460	-0.266	0.748	0.203	0.498
43	1994	0.670	0.158	0.054	0.882	0.250	0.578
43	1995	0.695	0.139	0.044	0.879	0.252	0.575
43	1996	0.667	0.165	0.053	0.885	0.239	0.597
43	1997	0.726	0.132	0.026	0.883	0.247	0.573
43	1998	0.736	0.127	0.020	0.883	0.232	0.581
43	1999	0.761	0.100	0.012	0.873	0.214	0.601
43	2000	0.758	0.118	0.005	0.880	0.194	0.619
43	2001	0.817	-0.020	0.027	0.824	0.188	0.621
43	2002	0.807	0.115	-0.028	0.893	0.193	0.590
43	2003	0.840	0.074	-0.034	0.879	0.180	0.594
43	2004	0.862	0.070	-0.047	0.884	0.184	0.577
44	1994	0.543	0.239	0.117	0.899	0.252	0.578
44	1995	0.556	0.201	0.127	0.884	0.258	0.574
44	1996	0.579	0.159	0.129	0.867	0.249	0.586
44	1997	0.572	0.201	0.116	0.889	0.255	0.573
44	1998	0.560	0.270	0.094	0.924	0.264	0.547
44	1999	0.562	0.244	0.104	0.910	0.248	0.574
44	2000	0.588	0.210	0.101	0.899	0.239	0.574
44	2001	0.595	0.250	0.075	0.920	0.231	0.580
44	2002	0.597	0.222	0.088	0.906	0.218	0.588
44	2003	0.597	0.210	0.093	0.900	0.204	0.595
44	2004	0.618	0.215	0.079	0.911	0.223	0.560
45	1994	0.409	0.515	0.081	1.005	0.290	0.525
45	1995	0.372	0.519	0.106	0.998	0.275	0.558
45	1996	0.379	0.484	0.117	0.980	0.261	0.580
45	1997	0.400	0.519	0.085	1.004	0.266	0.563
45	1998	0.410	0.568	0.057	1.036	0.284	0.520
45	1999	0.361	0.576	0.090	1.027	0.263	0.563
45	2000	0.380	0.538	0.094	1.013	0.257	0.561
45	2001	0.371	0.587	0.080	1.039	0.270	0.539
45	2002	0.385	0.505	0.106	0.995	0.225	0.597
45	2003	0.324	0.595	0.108	1.027	0.203	0.620
45	2004	0.328	0.592	0.109	1.028	0.211	0.606
46	1994	0.636	0.133	0.103	0.872	0.299	0.515
46	1995	0.611	0.151	0.113	0.875	0.291	0.535
46	1996	0.676	0.089	0.091	0.856	0.275	0.549
46	1997	0.728	0.044	0.073	0.845	0.275	0.540

46	1998	0.716	0.070	0.072	0.857	0.269	0.535
46	1999	0.728	0.084	0.054	0.867	0.259	0.542
46	2000	0.725	0.096	0.053	0.874	0.255	0.539
46	2001	0.733	0.104	0.044	0.881	0.253	0.531
46	2002	0.784	0.053	0.027	0.864	0.231	0.545
46	2003	0.826	0.061	-0.008	0.878	0.224	0.533
46	2004	0.868	0.023	-0.020	0.871	0.231	0.510
49	1994	0.739	0.209	-0.031	0.917	0.223	0.586
49	1995	0.659	0.259	0.008	0.926	0.222	0.601
49	1996	0.699	0.220	-0.005	0.914	0.214	0.610
49	1997	0.799	0.184	-0.064	0.918	0.216	0.591
49	1998	0.794	0.220	-0.077	0.937	0.217	0.579
49	1999	0.803	0.193	-0.071	0.925	0.206	0.596
49	2000	0.854	0.123	-0.076	0.901	0.200	0.594
49	2001	0.803	0.176	-0.062	0.917	0.196	0.604
49	2002	0.833	0.165	-0.080	0.918	0.182	0.608
49	2003	0.949	0.050	-0.117	0.882	0.158	0.620
49	2004	0.886	0.093	-0.083	0.896	0.181	0.591
53	1994	0.639	0.290	0.014	0.942	0.279	0.526
53	1995	0.616	0.293	0.030	0.939	0.275	0.539
53	1996	0.597	0.331	0.027	0.955	0.274	0.541
53	1997	0.656	0.203	0.043	0.902	0.267	0.549
53	1998	0.628	0.359	-0.005	0.981	0.292	0.496
53	1999	0.572	0.367	0.033	0.972	0.276	0.532
53	2000	0.576	0.333	0.045	0.954	0.257	0.557
53	2001	0.618	0.387	-0.013	0.991	0.257	0.539
53	2002	0.569	0.384	0.027	0.981	0.253	0.548
53	2003	0.637	0.339	-0.005	0.971	0.238	0.557
53	2004	0.669	0.344	-0.027	0.985	0.263	0.507
57	1994	0.659	0.317	-0.027	0.949	0.256	0.538
57	1995	0.618	0.319	0.005	0.942	0.258	0.548
57	1996	0.744	0.236	-0.053	0.927	0.251	0.538
57	1997	0.445	0.445	0.083	0.973	0.266	0.561
57	1998	0.550	0.451	-0.001	1.000	0.268	0.525
57	1999	0.553	0.429	0.006	0.988	0.250	0.553
57	2000	0.651	0.346	-0.032	0.965	0.232	0.558
57	2001	0.630	0.395	-0.038	0.987	0.233	0.556
57	2002	0.730	0.287	-0.066	0.952	0.204	0.573
57	2003	0.750	0.278	-0.077	0.951	0.188	0.579
57	2004	0.775	0.280	-0.094	0.961	0.206	0.544
58	2000	0.900	-0.358	0.131	0.673	0.161	0.676
58	2001	0.925	-0.366	0.115	0.674	0.154	0.681
58	2002	0.934	-0.364	0.109	0.679	0.155	0.665
58	2003	0.946	-0.387	0.110	0.669	0.131	0.685
58	2004	0.972	-0.394	0.096	0.674	0.143	0.660
58	2005	0.985	-0.397	0.087	0.676	0.132	0.665
59	1999	0.243	0.143	0.406	0.793	0.213	0.704
59	2000	0.240	0.140	0.410	0.790	0.199	0.715
59	2001	0.259	0.144	0.393	0.796	0.193	0.720
59	2002	0.251	0.131	0.407	0.790	0.192	0.711
59	2003	0.264	0.123	0.401	0.787	0.169	0.728

59	2004	0.269	0.138	0.392	0.799	0.184	0.703
59	2005	0.261	0.140	0.397	0.798	0.170	0.717

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

sum	yn	yvrc	yvoth	utility
0.650	0.974	-0.438	0.114	ENBRIDGE
0.679	0.900	-0.365	0.144	NICOR
0.690	0.972	-0.345	0.062	Peoples Gas Light
0.725	0.873	-0.270	0.122	Consumers Power
0.727	0.883	-0.264	0.108	Public Service Electric & Gas
0.743	0.844	-0.207	0.106	East Ohio Gas
0.758	1.251	-0.356	-0.137	Washington Gas Light
0.765	0.890	-0.179	0.054	Consolidated Edison
0.781	0.229	0.131	0.421	UNION GAS
0.792	0.557	0.028	0.207	Niagra Mohawk
0.811	0.818	-0.122	0.116	Pacific Gas & Electric
0.837	0.854	-0.100	0.082	SOUTHERN CALIFORNIA GAS
0.866	0.695	0.142	0.029	Connecticut Natural Gas
0.868	0.761	0.053	0.055	Questar (Mountain Fuel Supply)
0.872	0.838	0.003	0.031	Atlanta Gas Light
0.875	0.808	0.061	0.006	Washington Natural Gas
0.891	0.785	0.111	-0.005	People's Natural Gas
0.895	0.628	0.224	0.043	North Shore Gas
0.898	0.683	0.162	0.053	Peco (Philadelphia Electric)
0.903	0.602	0.198	0.103	Wisconsin Gas
0.907	0.687	0.197	0.023	COMMONWEALTH GAS
0.914	0.869	0.118	-0.072	new Jersey Natural Gas
0.917	0.758	0.179	-0.020	Rochester Gas and Electric
0.918	0.733	0.162	0.022	BALTIMORE GAS & ELECTRIC CO
0.939	0.370	0.401	0.167	Pg Energy (Penn Gas & Water)
0.939	0.387	0.413	0.138	Orange & Rockland Utilities
0.947	0.593	0.289	0.065	Illinois Power
0.961	0.502	0.349	0.110	Northwest Natural Gas
0.962	0.704	0.222	0.035	Southwest Gas
0.971	0.644	0.316	0.012	Louisville Gas and Electric
0.974	0.659	0.346	-0.031	Madison Gas & Electric
0.986	0.518	0.424	0.044	Connecticut Energy
1.007	0.468	0.448	0.091	Alabama Gas
1.023	0.516	0.457	0.049	Public Service of North Carolina
1.029	0.376	0.558	0.095	Wisconsin Power & Light
1.055	-0.022	0.780	0.296	Cascade Natural Gas
1.056	0.213	0.717	0.126	Central Hudson Gas
1.076	0.543	0.517	0.015	SAN DIEGO GAS & ELECTRIC

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

sum	yn	yvrc	yvoth	utility
0.674	0.944	-0.378	0.108	ENBRIDGE
0.699	0.867	-0.305	0.138	NICOR
0.710	0.941	-0.291	0.060	Peoples Gas Light
0.740	0.844	-0.221	0.117	Consumers Power
0.744	0.839	-0.201	0.107	Public Service Electric & Gas
0.759	0.805	-0.150	0.104	East Ohio Gas
0.770	1.178	-0.282	-0.127	Washington Gas Light
0.781	0.830	-0.108	0.059	Consolidated Edison
0.793	0.255	0.137	0.401	UNION GAS
0.802	0.564	0.041	0.197	Niagra Mohawk
0.820	0.741	-0.041	0.119	Pacific Gas & Electric
0.844	0.754	-0.001	0.091	SOUTHERN CALIFORNIA GAS
0.867	0.730	0.083	0.055	Questar (Mountain Fuel Supply)
0.868	0.692	0.149	0.028	Connecticut Natural Gas
0.873	0.778	0.059	0.036	Atlanta Gas Light
0.877	0.758	0.107	0.012	Washington Natural Gas
0.890	0.750	0.141	0.000	People's Natural Gas
0.895	0.622	0.229	0.043	North Shore Gas
0.896	0.654	0.188	0.055	Peco (Philadelphia Electric)
0.901	0.579	0.220	0.102	Wisconsin Gas
0.905	0.663	0.217	0.026	COMMONWEALTH GAS
0.914	0.802	0.172	-0.060	new Jersey Natural Gas
0.914	0.687	0.200	0.027	BALTIMORE GAS & ELECTRIC CO
0.915	0.717	0.210	-0.013	Rochester Gas and Electric
0.931	0.397	0.375	0.158	Pg Energy (Penn Gas & Water)
0.935	0.403	0.398	0.134	Orange & Rockland Utilities
0.941	0.562	0.312	0.068	Illinois Power
0.953	0.641	0.271	0.041	Southwest Gas
0.955	0.469	0.374	0.112	Northwest Natural Gas
0.961	0.616	0.330	0.015	Louisville Gas and Electric
0.963	0.646	0.344	-0.027	Madison Gas & Electric
0.977	0.501	0.428	0.047	Connecticut Energy
0.997	0.429	0.473	0.095	Alabama Gas
1.008	0.489	0.467	0.052	Public Service of North Carolina
1.014	0.374	0.545	0.094	Wisconsin Power & Light
1.040	0.001	0.752	0.287	Cascade Natural Gas
1.041	0.228	0.688	0.125	Central Hudson Gas
1.060	0.460	0.570	0.029	SAN DIEGO GAS & ELECTRIC

****

Date: 10/01/07 **** STANDARD SUR ESTIMATION RESULTS **** Time: 17:13:50

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

DATA FILE:C:\work\Oebgas\oebgasCS.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

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: 72
Number of variables written to GAUSS data set: 24
1
409

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SEEMINGLY UNRELATED REGRESSION WITH HETEROSKEDASTICITY 10/01/2007 5:13 pm

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Data Set: C:\work\Oebgas\Temp_3.dat

DIVISOR USING N IN EFFECT
RESTRICTIONS IN EFFECT

ITER. # = 0 LOG OF DETERMINANT OF SIGMA = 4.83226692
ITER. # = 1 LOG OF DETERMINANT OF SIGMA = 4.77723434
ITER. # = 2 LOG OF DETERMINANT OF SIGMA = 4.77652215
ITER. # = 3 LOG OF DETERMINANT OF SIGMA = 4.77648392
ITER. # = 4 LOG OF DETERMINANT OF SIGMA = 4.77648110
ITER. # = 5 LOG OF DETERMINANT OF SIGMA = 4.77648088
ITER. # = 6 LOG OF DETERMINANT OF SIGMA = 4.77648086
ITER. # = 7 LOG OF DETERMINANT OF SIGMA = 4.77648086
ITER. # = 8 LOG OF DETERMINANT OF SIGMA = 4.77648086

Equation: 1
Dependent variable: C

Total cases: 396 Valid cases: 396
Total SS: 316.532 Degrees of freedom: ----
R-squared: 0.975 Rbar-squared: 0.974
Residual SS: 8.059 Std error of est: 2.212
Durbin-Watson: 0.363

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	8.12476097	0.02518343	322.623	0.0000
WL	0.23618949	0.01585436	14.897	0.0000
WK	0.53070651	0.00621830	85.346	0.0000
Y1	0.66626216	0.05958864	11.181	0.0000
Y2	0.11232309	0.05404318	2.078	0.0383
Y3	0.09287475	0.02681795	3.463	0.0006
WLWL	-0.40970533	0.14146442	-2.896	0.0040

WLWK	-0.10226309	0.01426615	-7.168	0.0000
WKWK	0.16373398	0.01368103	11.968	0.0000
Y1Y1	0.13078341	0.20409700	0.641	0.5220
Y2Y2	-0.74502987	0.16627334	-4.481	0.0000
Y3Y3	0.14320033	0.02174380	6.586	0.0000
WLY1	0.01645860	0.01252117	1.314	0.1895
WLY2	-0.03925020	0.01140402	-3.442	0.0006
WLY3	0.01469831	0.00425181	3.457	0.0006
WKY1	-0.06562185	0.01413804	-4.642	0.0000
WKY2	0.04666421	0.01329797	3.509	0.0005
WKY3	0.01581226	0.00405996	3.895	0.0001
Y1Y2	0.30519848	0.17264858	1.768	0.0779
Y1Y3	-0.24451228	0.06153947	-3.973	0.0001
Y2Y3	0.11428995	0.05416895	2.110	0.0355
Z1	-0.69073679	0.05729674	-12.055	0.0000
Z2	-0.00620291	0.00107020	-5.796	0.0000
Z3	0.03637239	0.01394935	2.607	0.0095
TREND	-0.01124668	0.00270293	-4.161	0.0000
Y1TREND	-0.00296432	0.00941891	-0.315	0.7531
Y2TREND	0.00053901	0.00925396	0.058	0.9536
Y3TREND	0.00270473	0.00333873	0.810	0.4184
WLTREND	0.00163928	0.00303480	0.540	0.5894
WKTREND	0.00684103	0.00100179	6.829	0.0000

Equation: 2
Dependent variable: SL

Total cases:	396	Valid cases:	396
Total SS:	2.247	Degrees of freedom:	----
R-squared:	0.112	Rbar-squared:	0.129
Residual SS:	1.996	Std error of est:	2.364
Durbin-Watson:	0.405		

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	0.23618949	0.01585436	14.897	0.0000
WL	-0.40970533	0.14146442	-2.896	0.0040
WK	-0.10226309	0.01426615	-7.168	0.0000
Y1	0.01645860	0.01252117	1.314	0.1894
Y2	-0.03925020	0.01140402	-3.442	0.0006
Y3	0.01469831	0.00425181	3.457	0.0006

TREND	0.00163928	0.00303480	0.540	0.5894

Equation: 3
Dependent variable: SK

Total cases:	396	Valid cases:	396
Total SS:	2.617	Degrees of freedom:	----
R-squared:	0.226	Rbar-squared:	0.242
Residual SS:	2.025	Std error of est:	2.853
Durbin-Watson:	0.323		

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	0.53070651	0.00621830	85.346	0.0000
WL	-0.10226309	0.01426615	-7.168	0.0000
WK	0.16373398	0.01368103	11.968	0.0000
Y1	-0.06562185	0.01413804	-4.642	0.0000
Y2	0.04666421	0.01329797	3.509	0.0005
Y3	0.01581226	0.00405996	3.895	0.0001
TREND	0.00684103	0.00100179	6.829	0.0000

Equation: 4
Dependent variable: SM

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

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	0.23310400	0.01597176	14.595	0.0000
WL	0.51196842	0.14185850	3.609	0.0004
WK	-0.06147089	0.01308101	-4.699	0.0000
Y1	0.04916325	0.01255903	3.915	0.0001
Y2	-0.00741401	0.01167407	-0.635	0.5261
Y3	-0.03051057	0.00379470	-8.040	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
1598.865	+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	0
(0.00 %)	(0.00 %)	(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
6.976	7.353	-0.377	-3.265	0.001	Cascade Natural Gas
7.669	8.006	-0.337	-3.115	0.001	SAN DIEGO GAS & ELECTRIC
8.245	8.575	-0.331	-3.907	0.000	East Ohio Gas
9.646	9.895	-0.249	-2.480	0.007	SOUTHERN CALIFORNIA GAS
6.189	6.418	-0.229	-2.577	0.005	Madison Gas & Electric
6.618	6.835	-0.217	-2.416	0.008	North Shore Gas
6.803	6.968	-0.165	-2.047	0.020	Louisville Gas and Electric
8.576	8.735	-0.158	-1.785	0.037	Consolidated Edison
7.503	7.650	-0.147	-1.745	0.041	Wisconsin Gas
8.719	8.859	-0.140	-1.430	0.077	NICOR
7.213	7.344	-0.131	-1.539	0.062	Illinois Power
7.770	7.893	-0.123	-1.435	0.076	BALTIMORE GAS & ELECTRIC CO
6.468	6.576	-0.108	-1.168	0.121	Pg Energy (Penn Gas & Water)
7.752	7.823	-0.071	-0.830	0.203	Questar (Mountain Fuel Supply)
7.042	7.083	-0.041	-0.443	0.329	Connecticut Energy
7.086	7.126	-0.040	-0.464	0.321	Rochester Gas and Electric
8.424	8.463	-0.039	-0.448	0.327	Atlanta Gas Light
7.673	7.688	-0.015	-0.160	0.436	new Jersey Natural Gas
7.258	7.238	0.020	0.242	0.404	People's Natural Gas
7.163	7.130	0.033	0.384	0.350	COMMONWEALTH GAS
6.563	6.525	0.039	0.433	0.332	Wisconsin Power & Light
8.597	8.512	0.086	0.905	0.183	Peoples Gas Light
8.844	8.751	0.093	1.056	0.146	Public Service Electric & Gas
6.468	6.360	0.107	1.213	0.113	Orange & Rockland Utilities
7.834	7.720	0.115	1.337	0.091	Northwest Natural Gas
8.556	8.425	0.131	1.478	0.070	Consumers Power
8.510	8.374	0.136	1.582	0.057	Southwest Gas
7.955	7.812	0.143	1.667	0.048	Washington Natural Gas
7.716	7.565	0.151	1.726	0.042	Alabama Gas
7.010	6.831	0.180	1.877	0.030	Connecticut Natural Gas

8.465	8.230	0.235	2.298	0.011	Washington Gas Light
9.478	9.189	0.289	3.335	0.000	Pacific Gas & Electric
6.039	5.744	0.295	3.132	0.001	Central Hudson Gas
7.373	7.065	0.308	3.745	0.000	Public Service of North Carolina
8.057	7.689	0.368	4.448	0.000	Niagra Mohawk
7.714	7.286	0.428	5.129	0.000	Peco (Philadelphia Electric)

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

sum	yn	yvrc	yvoth	utility
0.628	1.006	-0.502	0.124	ENBRIDGE
0.658	0.925	-0.419	0.152	NICOR
0.674	1.021	-0.401	0.054	Peoples Gas Light
0.710	0.887	-0.307	0.130	Consumers Power
0.712	0.894	-0.297	0.115	Public Service Electric & Gas
0.731	0.859	-0.238	0.110	East Ohio Gas
0.744	1.266	-0.362	-0.160	Washington Gas Light
0.754	0.898	-0.197	0.053	Consolidated Edison
0.779	0.229	0.081	0.469	UNION GAS
0.791	0.584	-0.012	0.218	Niagra Mohawk
0.799	0.763	-0.103	0.139	Pacific Gas & Electric
0.825	0.778	-0.060	0.107	SOUTHERN CALIFORNIA GAS
0.869	0.791	0.037	0.041	Atlanta Gas Light
0.870	0.746	0.065	0.058	Questar (Mountain Fuel Supply)
0.875	0.735	0.128	0.013	Connecticut Natural Gas
0.877	0.794	0.080	0.003	Washington Natural Gas
0.897	0.781	0.128	-0.012	People's Natural Gas
0.904	0.672	0.179	0.054	Peco (Philadelphia Electric)
0.907	0.655	0.220	0.031	North Shore Gas
0.910	0.582	0.216	0.112	Wisconsin Gas
0.917	0.691	0.211	0.015	COMMONWEALTH GAS
0.920	0.848	0.157	-0.084	new Jersey Natural Gas
0.924	0.701	0.198	0.025	BALTIMORE GAS & ELECTRIC CO
0.926	0.750	0.205	-0.029	Rochester Gas and Electric
0.956	0.384	0.400	0.172	Pg Energy (Penn Gas & Water)
0.958	0.408	0.412	0.137	Orange & Rockland Utilities
0.958	0.564	0.324	0.070	Illinois Power
0.968	0.628	0.290	0.050	Southwest Gas
0.974	0.461	0.390	0.122	Northwest Natural Gas
0.986	0.615	0.360	0.010	Louisville Gas and Electric
0.993	0.663	0.377	-0.047	Madison Gas & Electric
1.006	0.505	0.460	0.041	Connecticut Energy
1.024	0.409	0.510	0.105	Alabama Gas
1.042	0.463	0.522	0.057	Public Service of North Carolina

1.053	0.349	0.605	0.099	Wisconsin Power & Light
1.084	-0.059	0.819	0.324	Cascade Natural Gas
1.088	0.207	0.754	0.127	Central Hudson Gas
1.095	0.436	0.627	0.032	SAN DIEGO GAS & ELECTRIC

JTC 8b ii elasticities.xls
GD model

Firm-ID	year	yn	yvrc	yvoth	sumY	WL	WK
1	1994	0.393	0.523	0.092	1.008	0.269	0.571
1	1995	0.409	0.481	0.103	0.993	0.274	0.566
1	1996	0.403	0.464	0.116	0.983	0.264	0.582
1	1997	0.423	0.441	0.113	0.978	0.266	0.576
1	1998	0.347	0.549	0.121	1.018	0.268	0.569
1	1999	0.359	0.536	0.118	1.013	0.259	0.580
1	2000	0.325	0.598	0.115	1.038	0.258	0.577
1	2001	0.397	0.526	0.093	1.016	0.245	0.586
1	2002	0.347	0.594	0.101	1.042	0.249	0.574
1	2003	0.363	0.566	0.101	1.030	0.231	0.597
1	2004	0.371	0.575	0.093	1.039	0.243	0.570
2	1994	0.730	0.091	0.044	0.866	0.285	0.516
2	1995	0.782	0.016	0.042	0.840	0.282	0.518
2	1996	0.740	0.055	0.055	0.850	0.271	0.540
2	1997	0.721	0.097	0.050	0.869	0.277	0.528
2	1998	0.649	0.161	0.079	0.889	0.279	0.523
2	1999	0.637	0.257	0.038	0.933	0.278	0.517
2	2000	0.785	-0.007	0.055	0.832	0.256	0.540
2	2001	0.775	0.086	0.015	0.876	0.257	0.529
2	2002	0.763	0.077	0.030	0.870	0.246	0.539
2	2003	0.784	0.053	0.025	0.861	0.231	0.556
2	2004	0.850	-0.002	0.005	0.852	0.257	0.503
3	1994	0.583	0.299	0.057	0.939	0.280	0.526
3	1995	0.579	0.297	0.062	0.937	0.275	0.536
3	1996	0.548	0.331	0.069	0.947	0.264	0.556
3	1997	0.469	0.419	0.089	0.977	0.276	0.547
3	1998	0.637	0.280	0.024	0.941	0.261	0.540
3	1999	0.638	0.238	0.045	0.920	0.246	0.566
3	2000	0.648	0.231	0.040	0.919	0.241	0.566
3	2001	0.709	0.234	-0.012	0.932	0.236	0.556
3	2002	0.770	0.121	-0.002	0.889	0.217	0.571
3	2003	0.868	0.023	-0.032	0.858	0.196	0.583
3	2004	0.862	0.035	-0.030	0.868	0.214	0.549
6	1994	-0.032	0.774	0.312	1.054	0.281	0.624
6	1995	-0.044	0.801	0.308	1.066	0.284	0.623
6	1996	-0.082	0.831	0.324	1.073	0.278	0.634
6	1997	-0.035	0.803	0.302	1.070	0.280	0.621
6	1998	-0.047	0.802	0.314	1.069	0.272	0.622
6	1999	-0.066	0.768	0.346	1.048	0.253	0.653
6	2000	-0.145	0.872	0.353	1.080	0.221	0.696
6	2001	-0.103	0.832	0.343	1.073	0.237	0.659
6	2002	-0.021	0.800	0.293	1.072	0.222	0.654
6	2003	-0.026	0.815	0.290	1.079	0.215	0.651
6	2004	0.013	0.783	0.277	1.073	0.215	0.637
7	1994	0.196	0.763	0.126	1.085	0.240	0.629
7	1995	0.094	0.825	0.179	1.098	0.247	0.634
7	1996	0.237	0.713	0.118	1.069	0.231	0.642
7	1997	0.112	0.795	0.180	1.087	0.237	0.652
7	1998	0.092	0.844	0.174	1.109	0.241	0.637
7	1999	0.075	0.823	0.198	1.095	0.230	0.658

7	2000	0.200	0.729	0.145	1.073	0.221	0.648
7	2001	0.273	0.708	0.095	1.076	0.208	0.652
7	2002	0.205	0.757	0.126	1.089	0.205	0.651
7	2003	0.392	0.595	0.056	1.044	0.181	0.655
7	2004	0.416	0.577	0.049	1.043	0.192	0.630
9	1994	0.572	0.332	0.045	0.949	0.256	0.565
9	1995	0.512	0.412	0.053	0.977	0.253	0.574
9	1996	0.620	0.238	0.054	0.911	0.234	0.599
9	1997	0.658	0.207	0.039	0.905	0.234	0.596
9	1998	0.595	0.307	0.041	0.943	0.238	0.584
9	1999	0.776	0.178	-0.042	0.912	0.219	0.587
9	2000	0.707	0.173	0.017	0.897	0.204	0.618
9	2001	0.820	0.146	-0.061	0.905	0.200	0.600
9	2002	0.738	0.164	-0.002	0.900	0.195	0.610
9	2003	0.653	0.180	0.059	0.892	0.177	0.644
9	2004	0.691	0.169	0.039	0.899	0.198	0.600
10	1994	0.445	0.511	0.056	1.011	0.257	0.573
10	1995	0.496	0.469	0.036	1.001	0.252	0.575
10	1996	0.471	0.466	0.057	0.995	0.244	0.594
10	1997	0.548	0.445	0.007	1.000	0.246	0.578
10	1998	0.641	0.422	-0.056	1.007	0.246	0.553
10	1999	0.638	0.392	-0.043	0.987	0.207	0.614
10	2000	0.678	0.359	-0.055	0.982	0.217	0.587
10	2001	0.726	0.363	-0.095	0.994	0.216	0.576
10	2002	0.230	0.592	0.196	1.018	0.228	0.625
10	2003	0.290	0.534	0.176	1.000	0.206	0.642
10	2004	0.189	0.574	0.242	1.005	0.221	0.632
11	1994	0.515	0.207	0.155	0.877	0.234	0.625
11	1995	0.426	0.257	0.202	0.885	0.232	0.643
11	1996	0.397	0.277	0.214	0.888	0.220	0.666
11	1997	0.670	0.131	0.065	0.866	0.206	0.645
11	1998	0.693	0.114	0.058	0.864	0.206	0.635
11	1999	0.883	-0.024	-0.028	0.830	0.186	0.636
11	2000	0.901	-0.018	-0.045	0.837	0.179	0.637
11	2001	0.932	0.011	-0.086	0.857	0.177	0.627
11	2002	0.900	0.098	-0.102	0.896	0.179	0.608
11	2003	0.819	0.189	-0.084	0.925	0.167	0.625
11	2004	0.837	0.246	-0.125	0.958	0.178	0.593
12	1994	0.588	0.207	0.089	0.884	0.209	0.638
12	1995	0.543	0.227	0.117	0.887	0.213	0.641
12	1996	0.658	0.126	0.075	0.858	0.197	0.653
12	1997	0.654	0.014	0.136	0.804	0.189	0.678
12	1998	0.709	-0.061	0.131	0.779	0.180	0.680
12	1999	0.867	-0.260	0.103	0.710	0.159	0.697
12	2000	1.135	-0.438	-0.024	0.673	0.145	0.673
12	2001	1.192	-0.452	-0.063	0.677	0.137	0.673
12	2002	1.087	-0.413	0.004	0.678	0.130	0.688
12	2003	1.049	-0.306	-0.020	0.723	0.126	0.681
12	2004	0.816	-0.139	0.088	0.766	0.147	0.675
13	1994	0.824	-0.253	0.142	0.713	0.238	0.588
13	1995	0.862	-0.291	0.131	0.702	0.234	0.592

13	1996	0.833	-0.295	0.158	0.696	0.230	0.603
13	1997	0.834	-0.265	0.143	0.712	0.233	0.593
13	1998	0.835	-0.200	0.110	0.745	0.236	0.571
13	1999	0.826	-0.224	0.129	0.731	0.223	0.597
13	2000	0.835	-0.258	0.142	0.719	0.221	0.589
13	2001	0.883	-0.250	0.098	0.732	0.219	0.581
13	2002	0.905	-0.286	0.099	0.718	0.200	0.594
13	2003	0.923	-0.319	0.102	0.706	0.184	0.603
13	2004	0.905	-0.282	0.103	0.726	0.211	0.560
15	1994	0.813	-0.202	0.117	0.728	0.190	0.657
15	1995	0.828	-0.234	0.124	0.717	0.197	0.651
15	1996	0.859	-0.237	0.102	0.724	0.207	0.628
15	1997	0.836	-0.231	0.116	0.722	0.190	0.655
15	1998	0.810	-0.164	0.107	0.754	0.211	0.613
15	1999	0.793	-0.161	0.118	0.750	0.193	0.643
15	2000	0.826	-0.201	0.111	0.736	0.174	0.658
15	2001	0.835	-0.150	0.079	0.764	0.181	0.640
15	2002	0.823	-0.156	0.092	0.759	0.164	0.654
15	2003	0.795	-0.176	0.125	0.744	0.145	0.675
15	2004	0.838	-0.170	0.093	0.760	0.172	0.621
17	1994	0.598	0.281	0.052	0.931	0.263	0.547
17	1995	0.525	0.338	0.084	0.947	0.270	0.550
17	1996	0.601	0.194	0.094	0.889	0.244	0.586
17	1997	0.522	0.331	0.089	0.942	0.252	0.575
17	1998	0.500	0.404	0.071	0.975	0.252	0.561
17	1999	0.502	0.385	0.079	0.966	0.246	0.573
17	2000	0.519	0.364	0.078	0.960	0.240	0.570
17	2001	0.510	0.392	0.070	0.972	0.233	0.578
17	2002	0.530	0.372	0.065	0.967	0.223	0.578
17	2003	0.545	0.336	0.071	0.952	0.199	0.598
17	2004	0.547	0.391	0.043	0.981	0.211	0.570
21	1994	0.630	-0.026	0.180	0.784	0.223	0.636
21	1995	0.490	0.039	0.263	0.792	0.228	0.652
21	1996	0.549	-0.020	0.246	0.774	0.223	0.655
21	1997	0.552	-0.046	0.257	0.763	0.221	0.662
21	1998	0.567	0.010	0.217	0.795	0.223	0.641
21	1999	0.573	-0.028	0.232	0.777	0.212	0.658
21	2000	0.594	-0.058	0.232	0.768	0.211	0.652
21	2001	0.613	-0.034	0.206	0.785	0.215	0.637
21	2002	0.530	0.124	0.194	0.847	0.216	0.623
21	2003	0.629	0.046	0.150	0.825	0.185	0.649
21	2004	0.659	0.054	0.124	0.838	0.196	0.618
22	1994	0.550	0.277	0.086	0.914	0.216	0.633
22	1995	0.699	0.164	0.024	0.887	0.215	0.619
22	1996	0.612	0.198	0.077	0.887	0.205	0.646
22	1997	0.641	0.209	0.049	0.899	0.207	0.634
22	1998	0.623	0.288	0.025	0.936	0.213	0.610
22	1999	0.648	0.239	0.029	0.916	0.197	0.635
22	2000	0.673	0.211	0.024	0.909	0.191	0.630
22	2001	0.657	0.281	0.001	0.939	0.186	0.633
22	2002	0.660	0.227	0.027	0.914	0.172	0.645

22	2003	0.662	0.195	0.041	0.899	0.150	0.665
22	2004	0.661	0.216	0.035	0.912	0.165	0.638
23	1994	0.900	-0.372	0.139	0.666	0.212	0.622
23	1995	0.920	-0.399	0.138	0.658	0.216	0.618
23	1996	0.925	-0.430	0.149	0.644	0.204	0.637
23	1997	0.857	-0.373	0.176	0.660	0.206	0.639
23	1998	0.812	-0.282	0.169	0.699	0.216	0.614
23	1999	0.850	-0.324	0.158	0.684	0.200	0.635
23	2000	0.831	-0.346	0.188	0.673	0.202	0.627
23	2001	0.911	-0.335	0.115	0.690	0.184	0.636
23	2002	0.915	-0.381	0.136	0.670	0.172	0.644
23	2003	0.966	-0.410	0.108	0.665	0.151	0.651
23	2004	0.940	-0.382	0.119	0.677	0.166	0.629
24	1994	0.377	0.457	0.139	0.974	0.267	0.587
24	1995	0.401	0.449	0.126	0.975	0.273	0.578
24	1996	0.409	0.427	0.130	0.966	0.263	0.591
24	1997	0.428	0.406	0.127	0.962	0.269	0.578
24	1998	0.405	0.410	0.146	0.961	0.261	0.579
24	1999	0.431	0.377	0.141	0.949	0.245	0.596
24	2000	0.393	0.416	0.153	0.961	0.237	0.601
24	2001	0.388	0.431	0.150	0.968	0.231	0.602
24	2002	0.493	0.384	0.088	0.964	0.214	0.596
24	2003	0.506	0.421	0.058	0.986	0.209	0.583
24	2004	0.510	0.372	0.084	0.965	0.209	0.580
26	1994	0.212	0.524	0.236	0.973	0.231	0.662
26	1995	0.159	0.539	0.273	0.972	0.233	0.669
26	1996	0.326	0.469	0.170	0.965	0.212	0.674
26	1997	0.233	0.527	0.220	0.980	0.229	0.664
26	1998	0.088	0.659	0.273	1.020	0.240	0.656
26	1999	0.322	0.351	0.239	0.912	0.208	0.685
26	2000	0.561	0.314	0.063	0.939	0.206	0.634
26	2001	0.590	0.337	0.028	0.955	0.202	0.629
26	2002	0.670	0.273	0.000	0.942	0.209	0.596
26	2003	0.655	0.255	0.017	0.926	0.166	0.656
26	2004	0.689	0.233	0.005	0.927	0.187	0.613
27	1994	0.692	-0.061	0.151	0.781	0.256	0.581
27	1995	0.710	-0.077	0.145	0.778	0.257	0.582
27	1996	0.665	0.003	0.143	0.811	0.271	0.559
27	1997	0.710	-0.054	0.135	0.790	0.252	0.582
27	1998	0.795	-0.145	0.114	0.764	0.244	0.570
27	1999	0.720	-0.039	0.120	0.801	0.239	0.579
27	2000	0.664	0.001	0.146	0.810	0.229	0.590
27	2001	0.633	0.060	0.142	0.835	0.229	0.583
27	2002	0.702	-0.001	0.117	0.818	0.215	0.582
27	2003	0.747	-0.073	0.120	0.793	0.207	0.579
27	2004	0.690	-0.001	0.133	0.822	0.225	0.548
28	1994	0.565	0.230	0.104	0.899	0.252	0.581
28	1995	0.525	0.252	0.126	0.903	0.254	0.585
28	1996	0.655	0.162	0.065	0.882	0.237	0.593
28	1997	0.622	0.232	0.057	0.911	0.245	0.583
28	1998	0.699	0.203	0.011	0.913	0.245	0.561

28	1999	0.668	0.187	0.042	0.896	0.217	0.609
28	2000	0.672	0.153	0.059	0.883	0.221	0.599
28	2001	0.657	0.228	0.035	0.920	0.236	0.570
28	2002	0.632	0.240	0.050	0.922	0.228	0.573
28	2003	0.696	0.165	0.037	0.898	0.212	0.583
28	2004	0.709	0.166	0.031	0.906	0.235	0.538
29	1994	0.924	-0.334	0.095	0.684	0.184	0.658
29	1995	1.090	-0.464	0.027	0.653	0.182	0.642
29	1996	0.948	-0.400	0.109	0.658	0.175	0.675
29	1997	0.996	-0.383	0.064	0.677	0.183	0.649
29	1998	0.967	-0.304	0.050	0.713	0.195	0.619
29	1999	0.969	-0.327	0.059	0.701	0.176	0.651
29	2000	1.003	-0.361	0.048	0.690	0.159	0.660
29	2001	1.007	-0.296	0.011	0.722	0.157	0.655
29	2002	0.948	-0.321	0.076	0.702	0.155	0.659
29	2003	0.951	-0.346	0.084	0.690	0.131	0.682
29	2004	1.091	-0.378	-0.011	0.702	0.140	0.639
30	1994	0.652	0.182	0.055	0.889	0.235	0.594
30	1995	0.662	0.171	0.055	0.888	0.244	0.579
30	1996	0.648	0.162	0.069	0.879	0.228	0.609
30	1997	0.793	0.109	-0.022	0.881	0.227	0.586
30	1998	0.914	0.121	-0.125	0.910	0.231	0.546
30	1999	0.822	0.134	-0.055	0.901	0.230	0.564
30	2000	0.767	0.165	-0.023	0.909	0.236	0.556
30	2001	0.908	0.094	-0.102	0.900	0.229	0.542
30	2002	0.726	0.181	0.003	0.910	0.221	0.570
30	2003	0.690	0.166	0.041	0.897	0.208	0.590
30	2004	0.687	0.182	0.039	0.909	0.228	0.553
31	1994	0.425	0.361	0.151	0.938	0.259	0.591
31	1995	0.411	0.390	0.149	0.950	0.260	0.589
31	1996	0.418	0.346	0.166	0.930	0.252	0.607
31	1997	0.397	0.378	0.167	0.942	0.252	0.609
31	1998	0.366	0.441	0.163	0.969	0.258	0.591
31	1999	0.355	0.429	0.176	0.960	0.242	0.617
31	2000	0.384	0.385	0.178	0.947	0.247	0.601
31	2001	0.413	0.379	0.162	0.954	0.269	0.561
31	2002	0.374	0.407	0.180	0.961	0.257	0.572
31	2003	0.404	0.353	0.183	0.940	0.238	0.590
31	2004	0.423	0.364	0.166	0.953	0.256	0.552
34	1994	0.817	-0.212	0.120	0.724	0.197	0.651
34	1995	0.750	-0.132	0.134	0.752	0.203	0.648
34	1996	0.823	-0.234	0.127	0.716	0.192	0.660
34	1997	0.849	-0.282	0.131	0.698	0.187	0.669
34	1998	0.871	-0.253	0.105	0.723	0.221	0.602
34	1999	0.833	-0.278	0.148	0.704	0.207	0.632
34	2000	0.869	-0.251	0.107	0.724	0.208	0.613
34	2001	0.849	-0.188	0.092	0.752	0.211	0.605
34	2002	0.852	-0.214	0.102	0.740	0.192	0.622
34	2003	0.871	-0.271	0.115	0.715	0.174	0.643
34	2004	1.017	-0.358	0.044	0.703	0.178	0.608
36	1994	0.417	0.547	0.065	1.029	0.297	0.524

36	1995	0.412	0.552	0.067	1.030	0.292	0.533
36	1996	0.429	0.481	0.089	0.999	0.281	0.552
36	1997	0.388	0.585	0.071	1.044	0.293	0.531
36	1998	0.398	0.603	0.056	1.057	0.295	0.513
36	1999	0.396	0.597	0.060	1.053	0.285	0.530
36	2000	0.485	0.432	0.073	0.990	0.272	0.540
36	2001	0.454	0.568	0.031	1.053	0.288	0.506
36	2002	0.463	0.516	0.051	1.031	0.279	0.512
36	2003	0.502	0.469	0.043	1.014	0.261	0.533
36	2004	0.517	0.469	0.036	1.022	0.286	0.486
37	1994	0.733	0.220	-0.031	0.921	0.234	0.575
37	1995	0.696	0.251	-0.018	0.930	0.231	0.585
37	1996	0.710	0.204	-0.005	0.909	0.221	0.603
37	1997	0.724	0.209	-0.017	0.916	0.229	0.588
37	1998	0.686	0.303	-0.031	0.957	0.238	0.565
37	1999	0.668	0.276	-0.005	0.939	0.218	0.601
37	2000	0.703	0.217	-0.002	0.918	0.212	0.602
37	2001	0.708	0.263	-0.029	0.942	0.212	0.593
37	2002	0.741	0.214	-0.027	0.928	0.214	0.574
37	2003	0.743	0.192	-0.021	0.914	0.179	0.620
37	2004	0.763	0.187	-0.029	0.920	0.201	0.578
38	1994	0.362	0.708	0.020	1.090	0.271	0.556
38	1995	0.384	0.674	0.023	1.081	0.287	0.535
38	1996	0.365	0.696	0.028	1.089	0.285	0.536
38	1997	0.361	0.683	0.040	1.083	0.286	0.535
38	1998	0.347	0.679	0.054	1.080	0.276	0.538
38	1999	0.395	0.630	0.040	1.065	0.265	0.546
38	2000	0.326	0.689	0.067	1.082	0.258	0.554
38	2001	0.339	0.693	0.055	1.086	0.250	0.554
38	2002	0.407	0.648	0.024	1.079	0.244	0.539
38	2003	0.397	0.660	0.025	1.082	0.224	0.557
38	2004	0.413	0.608	0.045	1.065	0.245	0.520
40	1994	0.697	-0.011	0.118	0.804	0.248	0.587
40	1995	0.740	-0.028	0.094	0.807	0.261	0.564
40	1996	0.732	-0.006	0.090	0.816	0.255	0.570
40	1997	0.726	-0.007	0.096	0.815	0.253	0.571
40	1998	0.747	-0.034	0.095	0.808	0.248	0.562
40	1999	0.716	-0.004	0.104	0.816	0.233	0.584
40	2000	0.651	0.050	0.129	0.831	0.228	0.589
40	2001	0.636	0.071	0.132	0.840	0.223	0.588
40	2002	0.671	0.072	0.104	0.846	0.209	0.588
40	2003	0.681	0.085	0.089	0.855	0.203	0.582
40	2004	0.702	0.047	0.095	0.843	0.206	0.569
41	1994	0.547	0.367	0.052	0.966	0.299	0.509
41	1995	0.554	0.364	0.051	0.969	0.318	0.483
41	1996	0.585	0.344	0.036	0.965	0.306	0.494
41	1997	0.598	0.334	0.032	0.964	0.308	0.486
41	1998	0.616	0.296	0.038	0.950	0.297	0.487
41	1999	0.594	0.305	0.050	0.949	0.283	0.508
41	2000	0.562	0.311	0.076	0.949	0.284	0.503
41	2001	0.539	0.383	0.056	0.978	0.268	0.515

41	2002	0.565	0.320	0.067	0.952	0.248	0.531
41	2003	0.592	0.302	0.055	0.949	0.237	0.531
41	2004	0.650	0.269	0.031	0.950	0.262	0.477
42	1994	0.962	-0.149	-0.027	0.786	0.238	0.565
42	1995	1.122	-0.270	-0.096	0.756	0.225	0.564
42	1996	1.250	-0.340	-0.165	0.745	0.212	0.563
42	1997	1.316	-0.386	-0.195	0.735	0.210	0.556
42	1998	1.383	-0.377	-0.252	0.754	0.212	0.527
42	1999	1.135	-0.249	-0.115	0.772	0.212	0.566
42	2000	1.012	-0.200	-0.039	0.774	0.207	0.588
42	2001	1.167	-0.292	-0.116	0.758	0.203	0.568
42	2002	1.116	-0.254	-0.093	0.769	0.199	0.571
42	2003	1.365	-0.384	-0.233	0.748	0.168	0.575
42	2004	1.502	-0.486	-0.285	0.731	0.203	0.497
43	1994	0.682	0.165	0.040	0.887	0.250	0.577
43	1995	0.705	0.146	0.032	0.883	0.253	0.575
43	1996	0.670	0.175	0.045	0.889	0.239	0.597
43	1997	0.726	0.143	0.018	0.887	0.247	0.573
43	1998	0.732	0.139	0.015	0.886	0.232	0.581
43	1999	0.757	0.109	0.009	0.875	0.214	0.601
43	2000	0.748	0.131	0.004	0.883	0.194	0.619
43	2001	0.824	-0.034	0.029	0.819	0.188	0.621
43	2002	0.785	0.137	-0.026	0.896	0.193	0.590
43	2003	0.820	0.090	-0.030	0.881	0.180	0.594
43	2004	0.836	0.090	-0.040	0.886	0.184	0.577
44	1994	0.543	0.252	0.111	0.905	0.252	0.578
44	1995	0.557	0.207	0.124	0.888	0.258	0.573
44	1996	0.583	0.157	0.129	0.869	0.249	0.586
44	1997	0.564	0.211	0.118	0.893	0.255	0.573
44	1998	0.536	0.297	0.100	0.932	0.264	0.547
44	1999	0.539	0.265	0.112	0.916	0.248	0.574
44	2000	0.567	0.226	0.111	0.903	0.239	0.574
44	2001	0.563	0.278	0.086	0.927	0.231	0.581
44	2002	0.566	0.243	0.103	0.911	0.218	0.589
44	2003	0.565	0.228	0.111	0.905	0.204	0.596
44	2004	0.578	0.239	0.100	0.917	0.223	0.561
45	1994	0.400	0.562	0.072	1.034	0.290	0.525
45	1995	0.362	0.561	0.102	1.025	0.275	0.558
45	1996	0.372	0.517	0.115	1.005	0.261	0.580
45	1997	0.381	0.567	0.084	1.032	0.266	0.563
45	1998	0.375	0.633	0.059	1.067	0.284	0.520
45	1999	0.325	0.635	0.097	1.056	0.263	0.563
45	2000	0.346	0.591	0.104	1.041	0.257	0.561
45	2001	0.323	0.653	0.093	1.069	0.270	0.539
45	2002	0.349	0.549	0.121	1.020	0.225	0.598
45	2003	0.272	0.655	0.128	1.055	0.203	0.620
45	2004	0.272	0.652	0.133	1.056	0.211	0.606
46	1994	0.643	0.136	0.095	0.874	0.299	0.514
46	1995	0.612	0.156	0.110	0.877	0.291	0.534
46	1996	0.682	0.086	0.088	0.855	0.275	0.549
46	1997	0.734	0.038	0.071	0.843	0.275	0.540

46	1998	0.714	0.070	0.072	0.856	0.269	0.535
46	1999	0.719	0.090	0.057	0.867	0.259	0.542
46	2000	0.709	0.107	0.059	0.874	0.255	0.539
46	2001	0.709	0.120	0.053	0.882	0.253	0.531
46	2002	0.765	0.061	0.036	0.863	0.231	0.545
46	2003	0.800	0.078	0.000	0.878	0.224	0.533
46	2004	0.841	0.038	-0.010	0.870	0.231	0.511
49	1994	0.749	0.233	-0.053	0.928	0.223	0.585
49	1995	0.660	0.286	-0.007	0.938	0.223	0.600
49	1996	0.701	0.242	-0.019	0.924	0.215	0.609
49	1997	0.798	0.212	-0.081	0.928	0.216	0.591
49	1998	0.782	0.258	-0.091	0.950	0.218	0.579
49	1999	0.792	0.225	-0.082	0.935	0.206	0.596
49	2000	0.849	0.146	-0.086	0.908	0.200	0.594
49	2001	0.786	0.206	-0.066	0.926	0.196	0.604
49	2002	0.813	0.197	-0.083	0.927	0.182	0.608
49	2003	0.941	0.068	-0.123	0.887	0.159	0.620
49	2004	0.867	0.116	-0.082	0.902	0.181	0.591
53	1994	0.642	0.320	-0.003	0.959	0.280	0.525
53	1995	0.616	0.320	0.018	0.954	0.275	0.539
53	1996	0.587	0.367	0.018	0.972	0.275	0.540
53	1997	0.663	0.214	0.036	0.913	0.267	0.549
53	1998	0.601	0.410	-0.010	1.001	0.292	0.496
53	1999	0.544	0.412	0.034	0.990	0.276	0.531
53	2000	0.551	0.368	0.050	0.969	0.257	0.557
53	2001	0.577	0.444	-0.010	1.011	0.258	0.539
53	2002	0.527	0.434	0.038	0.999	0.253	0.548
53	2003	0.597	0.386	0.004	0.988	0.238	0.557
53	2004	0.620	0.400	-0.016	1.004	0.263	0.507
57	1994	0.687	0.338	-0.052	0.974	0.256	0.538
57	1995	0.644	0.336	-0.014	0.966	0.258	0.548
57	1996	0.775	0.250	-0.076	0.948	0.252	0.538
57	1997	0.447	0.473	0.079	0.999	0.266	0.561
57	1998	0.541	0.497	-0.008	1.030	0.268	0.524
57	1999	0.545	0.469	0.001	1.016	0.250	0.553
57	2000	0.651	0.378	-0.039	0.990	0.232	0.558
57	2001	0.618	0.438	-0.042	1.014	0.233	0.556
57	2002	0.729	0.316	-0.071	0.974	0.204	0.573
57	2003	0.746	0.308	-0.080	0.973	0.188	0.579
57	2004	0.763	0.317	-0.095	0.985	0.206	0.545
58	2000	0.942	-0.436	0.137	0.644	0.161	0.676
58	2001	0.963	-0.441	0.123	0.645	0.154	0.682
58	2002	0.967	-0.436	0.119	0.650	0.154	0.666
58	2003	0.979	-0.463	0.122	0.639	0.130	0.686
58	2004	0.999	-0.467	0.111	0.644	0.143	0.661
58	2005	1.008	-0.467	0.104	0.645	0.131	0.666
59	1999	0.234	0.103	0.442	0.779	0.212	0.705
59	2000	0.229	0.099	0.449	0.776	0.199	0.717
59	2001	0.243	0.106	0.433	0.782	0.193	0.721
59	2002	0.232	0.091	0.452	0.775	0.191	0.712
59	2003	0.243	0.082	0.447	0.772	0.168	0.730

59	2004	0.239	0.104	0.442	0.785	0.183	0.704
59	2005	0.228	0.105	0.450	0.784	0.169	0.718

****

Date: 10/01/07 **** STANDARD SUR ESTIMATION RESULTS **** Time: 17:23:11

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

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: 72

Number of variables written to GAUSS data set: 24
1
409

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SEEMINGLY UNRELATED REGRESSION WITH HETEROSKEDASTICITY 10/01/2007 5:23 pm

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Data Set: C:\work\Oebgas\Temp_3.dat

DIVISOR USING N IN EFFECT
RESTRICTIONS IN EFFECT

ITER. # = 0 LOG OF DETERMINANT OF SIGMA = 4.82944526
ITER. # = 1 LOG OF DETERMINANT OF SIGMA = 4.76376399
ITER. # = 2 LOG OF DETERMINANT OF SIGMA = 4.76277808
ITER. # = 3 LOG OF DETERMINANT OF SIGMA = 4.76272795
ITER. # = 4 LOG OF DETERMINANT OF SIGMA = 4.76272369
ITER. # = 5 LOG OF DETERMINANT OF SIGMA = 4.76272328
ITER. # = 6 LOG OF DETERMINANT OF SIGMA = 4.76272324
ITER. # = 7 LOG OF DETERMINANT OF SIGMA = 4.76272324
ITER. # = 8 LOG OF DETERMINANT OF SIGMA = 4.76272324

Equation: 1
Dependent variable: C

Total cases: 396 Valid cases: 396
Total SS: 316.905 Degrees of freedom: ----
R-squared: 0.976 Rbar-squared: 0.975
Residual SS: 7.728 Std error of est: 2.198
Durbin-Watson: 0.344

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	8.19118933	0.02411156	339.720	0.0000
WL	0.22353504	0.01468257	15.225	0.0000
WK	0.56187023	0.00607285	92.522	0.0000
Y1	0.63223859	0.05902963	10.711	0.0000
Y2	0.15045322	0.05251223	2.865	0.0044
Y3	0.09061058	0.02696417	3.360	0.0009
WLWL	-0.36402516	0.13061348	-2.787	0.0056
WLWK	-0.09591436	0.01399347	-6.854	0.0000

WKWK	0.15702313	0.01347329	11.654	0.0000
Y1Y1	0.05875728	0.20573165	0.286	0.7753
Y2Y2	-0.75689927	0.16388902	-4.618	0.0000
Y3Y3	0.13442687	0.02159097	6.226	0.0000
WLY1	0.03331604	0.01154605	2.885	0.0041
WLY2	-0.05258387	0.01062698	-4.948	0.0000
WLY3	0.00852766	0.00391411	2.179	0.0300
WKY1	-0.10306087	0.01453992	-7.088	0.0000
WKY2	0.08361804	0.01376424	6.075	0.0000
WKY3	0.02486949	0.00405685	6.130	0.0000
Y1Y2	0.34942612	0.17246473	2.026	0.0435
Y1Y3	-0.22785202	0.06129234	-3.717	0.0002
Y2Y3	0.10309102	0.05406313	1.907	0.0573
Z1	-0.66473292	0.05500433	-12.085	0.0000
Z2	-0.00572519	0.00103092	-5.553	0.0000
Z3	0.04149969	0.01333232	3.113	0.0020
TREND	-0.00967777	0.00263810	-3.668	0.0003
Y1TREND	-0.00307187	0.00954545	-0.322	0.7478
Y2TREND	0.00003855	0.00913764	0.004	0.9966
Y3TREND	0.00290658	0.00340528	0.854	0.3939
WLTREND	0.00093180	0.00281785	0.331	0.7411
WKTREND	0.00664926	0.00099710	6.669	0.0000

Equation: 2

Dependent variable: SL

Total cases:	396	Valid cases:	396
Total SS:	1.940	Degrees of freedom:	----
R-squared:	0.067	Rbar-squared:	0.086
Residual SS:	1.810	Std error of est:	2.367
Durbin-Watson:	0.405		

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	0.22353504	0.01468257	15.225	0.0000
WL	-0.36402516	0.13061348	-2.787	0.0056
WK	-0.09591436	0.01399347	-6.854	0.0000
Y1	0.03331604	0.01154605	2.885	0.0041
Y2	-0.05258387	0.01062698	-4.948	0.0000
Y3	0.00852766	0.00391411	2.179	0.0299
TREND	0.00093180	0.00281785	0.331	0.7411

Equation: 3
Dependent variable: SK

Total cases: 396 Valid cases: 396
Total SS: 2.429 Degrees of freedom: ----
R-squared: 0.207 Rbar-squared: 0.222
Residual SS: 1.927 Std error of est: 2.984
Durbin-Watson: 0.342

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	0.56187023	0.00607285	92.522	0.0000
WL	-0.09591436	0.01399347	-6.854	0.0000
WK	0.15702313	0.01347329	11.654	0.0000
Y1	-0.10306087	0.01453992	-7.088	0.0000
Y2	0.08361804	0.01376424	6.075	0.0000
Y3	0.02486949	0.00405685	6.130	0.0000
TREND	0.00664926	0.00099710	6.669	0.0000

Equation: 4
Dependent variable: SM

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

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	0.21459473	0.01476625	14.533	0.0000
WL	0.45993952	0.13082508	3.516	0.0005
WK	-0.06110877	0.01275894	-4.789	0.0000
Y1	0.06974483	0.01192255	5.850	0.0000
Y2	-0.03103417	0.01116056	-2.781	0.0059
Y3	-0.03339715	0.00351090	-9.512	0.0000

MEASURES OF GOODNESS-OF-FIT

AN UNCENTERED SYSTEM R-SQUARE 0.983

A CENTERED SYSTEM R-SQUARE 0.983

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
1612.874	+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	0
(0.00 %)	(0.00 %)	(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
7.028	7.401	-0.373	-3.273	0.001	Cascade Natural Gas
7.719	8.063	-0.344	-3.287	0.001	SAN DIEGO GAS & ELECTRIC
8.307	8.624	-0.317	-3.835	0.000	East Ohio Gas
6.233	6.473	-0.239	-2.775	0.003	Madison Gas & Electric
6.674	6.902	-0.228	-2.618	0.004	North Shore Gas
9.711	9.923	-0.212	-2.145	0.016	SOUTHERN CALIFORNIA GAS
6.802	7.011	-0.209	-2.700	0.004	Louisville Gas and Electric
7.533	7.712	-0.179	-2.186	0.015	Wisconsin Gas
8.632	8.806	-0.174	-2.004	0.023	Consolidated Edison
7.831	7.955	-0.125	-1.479	0.070	BALTIMORE GAS & ELECTRIC CO
7.322	7.399	-0.078	-0.929	0.177	Illinois Power
8.819	8.890	-0.071	-0.742	0.229	NICOR
7.096	7.154	-0.058	-0.639	0.261	Connecticut Energy
8.443	8.498	-0.055	-0.649	0.258	Atlanta Gas Light
7.705	7.760	-0.054	-0.607	0.272	new Jersey Natural Gas
7.828	7.878	-0.050	-0.603	0.273	Questar (Mountain Fuel Supply)
6.578	6.624	-0.046	-0.510	0.305	Pg Energy (Penn Gas & Water)
7.179	7.194	-0.015	-0.185	0.427	Rochester Gas and Electric
7.200	7.208	-0.008	-0.095	0.462	COMMONWEALTH GAS
6.599	6.587	0.012	0.134	0.447	Wisconsin Power & Light
7.353	7.309	0.043	0.523	0.300	People's Natural Gas
8.895	8.838	0.057	0.666	0.253	Public Service Electric & Gas
7.888	7.796	0.092	1.105	0.135	Northwest Natural Gas
6.527	6.430	0.097	1.132	0.129	Orange & Rockland Utilities
7.978	7.878	0.100	1.191	0.117	Washington Natural Gas
7.711	7.602	0.108	1.268	0.103	Alabama Gas
8.674	8.556	0.118	1.287	0.099	Peoples Gas Light
8.521	8.394	0.127	1.505	0.066	Southwest Gas
8.618	8.489	0.128	1.482	0.069	Consumers Power
7.072	6.853	0.219	2.335	0.010	Connecticut Natural Gas
6.084	5.837	0.248	2.656	0.004	Central Hudson Gas

8.511	8.255	0.256	2.524	0.006	Washington Gas Light
9.551	9.284	0.267	3.174	0.001	Pacific Gas & Electric
7.372	7.064	0.308	3.831	0.000	Public Service of North Carolina
8.123	7.781	0.342	4.191	0.000	Niagra Mohawk
7.791	7.332	0.459	5.696	0.000	Peco (Philadelphia Electric)

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

sum	yn	yvrc	yvoth	utility
0.645	0.977	-0.452	0.120	ENBRIDGE
0.672	0.893	-0.367	0.145	NICOR
0.690	0.990	-0.356	0.056	Peoples Gas Light
0.718	0.860	-0.266	0.123	Consumers Power
0.723	0.855	-0.243	0.111	Public Service Electric & Gas
0.742	0.823	-0.189	0.108	East Ohio Gas
0.757	1.212	-0.308	-0.147	Washington Gas Light
0.767	0.845	-0.136	0.058	Consolidated Edison
0.779	0.235	0.099	0.445	UNION GAS
0.795	0.581	0.006	0.209	Niagra Mohawk
0.800	0.702	-0.035	0.133	Pacific Gas & Electric
0.826	0.700	0.021	0.104	SOUTHERN CALIFORNIA GAS
0.867	0.747	0.080	0.040	Atlanta Gas Light
0.867	0.721	0.089	0.057	Questar (Mountain Fuel Supply)
0.879	0.753	0.117	0.009	Washington Natural Gas
0.880	0.725	0.135	0.020	Connecticut Natural Gas
0.897	0.752	0.152	-0.006	People's Natural Gas
0.903	0.645	0.201	0.056	Peco (Philadelphia Electric)
0.906	0.560	0.237	0.109	Wisconsin Gas
0.910	0.644	0.228	0.038	North Shore Gas
0.917	0.667	0.228	0.022	COMMONWEALTH GAS
0.921	0.665	0.228	0.028	BALTIMORE GAS & ELECTRIC CO
0.923	0.794	0.199	-0.070	new Jersey Natural Gas
0.927	0.716	0.231	-0.020	Rochester Gas and Electric
0.950	0.397	0.385	0.168	Pg Energy (Penn Gas & Water)
0.953	0.536	0.344	0.072	Illinois Power
0.956	0.410	0.407	0.139	Orange & Rockland Utilities
0.958	0.582	0.327	0.049	Southwest Gas
0.967	0.431	0.414	0.122	Northwest Natural Gas
0.978	0.593	0.371	0.015	Louisville Gas and Electric
0.988	0.650	0.375	-0.036	Madison Gas & Electric
1.000	0.487	0.466	0.047	Connecticut Energy
1.014	0.376	0.532	0.106	Alabama Gas
1.029	0.442	0.529	0.058	Public Service of North Carolina
1.042	0.343	0.598	0.101	Wisconsin Power & Light

1.069	-0.053	0.807	0.315	Cascade Natural Gas
1.079	0.208	0.739	0.131	Central Hudson Gas
1.080	0.372	0.670	0.038	SAN DIEGO GAS & ELECTRIC

Correct elasticitiy estimates

Firm-ID	year	yn	yvrc	yvoth	sumY	sumY2
58	2000	0.927	-0.416	0.137	0.648	1.064
58	2001	0.954	-0.426	0.121	0.649	1.075
58	2002	0.967	-0.425	0.114	0.656	1.081
58	2003	0.983	-0.453	0.114	0.644	1.097
58	2004	0.997	-0.450	0.103	0.650	1.100
58	2005	1.017	-0.458	0.092	0.652	1.110

Previous elasticity estimates (provided in response to EGD #15)

Firm-ID	year	yn	yvrc	yvoth	sumY	sumY2
58	2000	0.808	-0.564	0.144	0.389	0.952
58	2001	0.813	-0.570	0.134	0.377	0.947
58	2002	0.833	-0.577	0.135	0.391	0.968
58	2003	0.835	-0.610	0.136	0.362	0.972
58	2004	0.846	-0.611	0.134	0.369	0.980
58	2005	0.855	-0.619	0.129	0.365	0.984

Note: sumY is the sum of the output elasticities with yvrc not set to zero
sumY2 is the sime of output elasticities with yvrc set to zero

UNDERTAKING JTC.9

Tr: 38

DR. LOWRY TO PROVIDE WRITTEN RESPONSE TO ENBRIDGE QUESTION NO. 21

RESPONSE:

We did not use company-specific rates of technological change in our econometric TFP projections for two reasons:

1. These projections do not vary much by company.

2. These projections require good data --- which are not readily available --- on how the input prices of Enbridge and Union compare to those of the sampled U.S. utilities.

WITNESSES:

Mark Lowry

UNDERTAKING JTC.10

Tr: 38

DR. LOWRY TO PROVIDE WRITTEN RESPONSE TO ENBRIDGE QUESTION NO. 22

RESPONSE:

In constructing the frost variable, we consulted a map available from RSMeans that shows the maximum depth of frost penetration in inches. The frost variable is defined as 78.75 – inches of frost depth for the LDC. The 78.75 is 125% of the maximum values of 63 for sampled LDCs. Please see the attached file JTC 10 Attachment.xls. Enbridge was assigned a frost penetration of 60 inches and a value of the frost variable 18.75. The data do not vary by year and therefore no update for 2005 is required.

WITNESSES:

Mark Lowry

JTC 10 Attachment.xls

COMPANY	ID	Frost Depth	FROST = 78.75 - Frost Depth
Alabama Gas	1	*3.00*	*75.75*
Atlanta Gas Light	2	*3.00*	*75.75*
Baltimore Gas and Electric	3	*18.00*	*60.75*
Cascade Natural Gas	6	*12.00*	*66.75*
Central Hudson Gas & Elect	7	*36.00*	*42.75*
Commonwealth Gas	9	*45.00*	*33.75*
Connecticut Energy	10	*48.00*	*30.75*
Connecticut Natural Gas	11	*48.00*	*30.75*
Consolidated Edison	12	*36.00*	*42.75*
Consumers Power	13	*63.00*	*15.75*
East Ohio Gas	15	*36.00*	*42.75*
Illinois Power	17	*30.00*	*48.75*
Niagara Mohawk	21	*54.00*	*24.75*
North Shore Gas	22	*42.00*	*36.75*
Northern Illinois Gas (NIC	23	*36.00*	*42.75*
Northwest Natural Gas	24	*4.00*	*74.75*
Orange & Rockland Utilitie	26	*36.00*	*42.75*
Pacific Gas & Electric	27	*3.00*	*75.75*
Peco (Philadelphia Electri	28	*36.00*	*42.75*
Peoples Gas Light & Coke	29	*36.00*	*42.75*
People's Natural Gas	30	*63.00*	*15.75*
Pg Energy (Penn Gas & Wate	31	*45.00*	*33.75*
Public Service Electric &	34	*36.00*	*42.75*
Public Service of NC	36	*10.00*	*68.75*
Rochester Gas and Electric	37	*54.00*	*24.75*
San Diego Gas & Electric	38	-	*78.75*
Southern California Gas	40	*2.00*	*76.75*
Southwest Gas	41	*12.00*	*66.75*
Washington Gas Light	42	*18.00*	*60.75*
Washington Natural Gas	43	*12.00*	*66.75*
Wisconsin Gas	44	*63.00*	*15.75*
Wisconsin Power & Light	45	*60.00*	*18.75*
Mountain Fuel Supply	46	*27.00*	*51.75*
New Jersey Natural Gas	49	*36.00*	*42.75*
Louisville G and E	53	*9.00*	*69.75*
Madison G & E	57	*45.00*	*33.75*

UNDERTAKING JTC.11

Tr: 38

DR. LOWRY TO PROVIDE WRITTEN RESPONSE TO ENBRIDGE QUESTION NO. 23

RESPONSE:

a) In the output index for the June report, PEG did include transmission volumes in the "Other Volume" deliveries for Union but did not include a storage variable.

b)
   i) PEG did not have an explicit breakdown of M12 transportation deliveries. This was not a separate category in our output indexes.
   ii) Storage deliveries were not included in our output indexes.
   iii) PEG cannot separate out M12 from the "Other Volume" category.

c) PEG excluded storage deliveries from its U.S. output variables.

WITNESSES:

Mark Lowry

UNDERTAKING JTC.12

Tr: 38

DR. LOWRY TO PROVIDE WRITTEN RESPONSE TO ENBRIDGE QUESTION NO. 24

RESPONSE:

a) Yes

b) Yes

WITNESSES:

Mark Lowry

UNDERTAKING JTC.14

Tr: 38

DR. LOWRY TO PROVIDE WRITTEN RESPONSE TO ENBRIDGE QUESTION NO. 26

RESPONSE:

a) No, we did not compute correlation coefficients between US utility outputs.

b) No, we did not perform any multicollinearity analysis.

c) As stated in (a) we did not perform any correlation computations between US utility outputs. Moreover, it is not typically necessary to do this or undertake multicollinearity analysis, as long as parameters estimates are sensible and statistically significant. Concern about multicollinearity is, however, one of the reasons that we removed the output interaction terms from the model.

WITNESSES:

Mark Lowry

UNDERTAKING JTC.15

Tr: 38

DR. LOWRY TO PROVIDE WRITTEN RESPONSE TO ENBRIDGE QUESTION NO. 27

RESPONSE:

a) No. In the US utility context that we are considering, there is no a priori reason to expect that technological representation of the firms would be different in different subgroups. There are, however, differences in the operating environment of the different firms and we account for those differences by including important business condition variables when estimating our models.

b) We did not attempt to estimate our econometric cost models on subgroups of US utilities. Two important reasons are provided above. In addition, when carrying out econometric model estimation, it is generally desirable to have as much data as possible in order to identify the relevant cost drivers.

WITNESSES:

Mark Lowry

UNDERTAKING JTC.17

Tr: 60

DR. LOWRY TO PROVIDE WRITTEN RESPONSE TO ENBRIDGE QUESTION NO. 15, AND ONLY THE PORTION RELATING TO NEW MENUMONICS WITH THE ADDITION NOTED BY MR. LISTER

RESPONSE:

We add the following to the list of mneumonics in our response to EGD Question 15.

YV	= Total Delivery Volume
YVRC	= Residential and Commercial Delivery Volume
YVOTH	= Other Delivery Volume

WITNESSES:

Mark Lowry

UNDERTAKING JTC.18

Tr: 62

DR. LOWRY TO DOUBLE CHECK THE INCENTIVE POWER RESULTS FOR THE SUPERIOR COST PERFORMER SCENARIO

RESPONSE:

If Enbridge was a demonstratively superior cost performer it would have less prospect for accelerated productivity growth under the IR plan. The incentive power model can be used to assess the appropriate reduction to the stretch factor for this case. The attached table labeled "JTC18 Attachment" provides suggestive results. We have been making stretch factor recommendations using the incentive power model by taking the difference between the long run average performance gains (rightmost column) for three and six year plan terms (with no earnings sharing) and then dividing the difference by two in order to share the expected benefits. Results are presented for three alternatives to the base assumption in our previous work that the company's initial operating efficiency is 20% from the production frontier. These alternatives are: 10%, 5%, and 0% from the frontier. The expected productivity growth of the inefficient company should be compared with the expected productivity growth of the sampled utilities. We assume that these typically operated with a three year regulatory lag and had 20% initial operating efficiency.

It can be seen that the difference in long run performance gains under these scenarios is fairly small. For example, the indicated stretch factor for 0% inefficiency is 0.33% [(1.66-1.01)/2] instead of 0.44 [(1.88-1.01)/2] for 20% inefficiency.

If an ESM were added to the IR plan, Enbridge would once again have less prospect for accelerated productivity growth due to the weaker performance incentives. The incentive power model can once again be used to assess the appropriate reduction to the stretch factor. For example, the indicated stretch factor for an ESM that shares *all* earnings surpluses and deficits 50/50 would be (1.36-1.01)/2 = 0.175. A smaller markdown would be indicated if the ESM had a deadband [PEG's model does not currently consider this scenario].

Using the incentive power model in the manner detailed above, the combined effect of these two circumstances would be a stretch factor that is a little lower

than that resulting from the ESM scenario just discussed. For example, if the Company operated at 0% inefficiency, the indicated stretch factor would be -.10 [(1.20-1.01)/2].

WITNESSES:

Mark Lowry

JTC 18 Attachment

Incentive Power Results

Initial inefficiency = 20%	**Average Annual Performance Gain**			
	1st Rate Cycle	2nd rate cycle	3rd rate cycle	Long run
Reference Regulatory Options				
2 Year Cost of Service	0.41%	0.44%	0.54%	0.70%
3 Year Cost of Service	0.85%	0.91%	0.98%	1.01%
Full Rate Externalization	5.63%	4.58%	4.45%	4.48%
Impact of Plan Term				
Term = 3 years	0.85%	0.91%	0.98%	1.01%
Term = 6 years	1.52%	1.55%	1.72%	1.88%
Term = 10 years	2.05%	2.41%	2.73%	2.53%
Impact of Earnings Sharing				
3-year plans, ESM				
No Sharing	0.85%	0.91%	0.98%	1.01%
Company Share = 75%	0.66%	0.70%	0.74%	0.86%
Company Share = 50%	0.53%	0.57%	0.64%	0.72%
Company Share = 25%	0.37%	0.46%	0.55%	0.59%
6-year plans, ESM				
No Sharing	1.52%	1.55%	1.72%	1.88%
Company Share = 75%	1.24%	1.45%	1.58%	1.57%

Company Share = 50%	0.98%	1.16%	1.33%	1.36%
Company Share = 25%	0.92%	0.97%	1.09%	1.12%

Impact of Partial Plan Update Externalization

3-Year Plans, Extern

Externalized Percentage = 0%	0.85%	0.91%	0.98%	1.01%
Externalized Percentage = 10%	2.30%	2.27%	2.35%	2.77%
Externalized Percentage = 25%	3.84%	3.30%	3.35%	3.61%
Externalized Percentage = 50%	5.82%	4.03%	3.98%	4.11%

6-Year Plans, Extern

Externalized Percentage = 0%	1.52%	1.55%	1.72%	1.88%
Externalized Percentage = 10%	1.90%	2.10%	2.29%	2.42%
Externalized Percentage = 25%	2.83%	2.96%	3.10%	3.26%
Externalized Percentage = 50%	4.14%	3.85%	3.89%	3.95%

Initial inefficiency = 10%

	Average Annual Performance Gain			
	1st Rate Cycle	2nd rate cycle	3rd rate cycle	Long run
Reference Regulatory Options				
2 Year Cost of Service	0.30%	0.32%	0.36%	0.66%
3 Year Cost of Service	0.64%	0.79%	0.87%	0.94%
Full Rate Externalization	4.72%	4.16%	4.13%	4.20%
Impact of Plan Term				
Term = 3 years	0.64%	0.79%	0.87%	**0.94%**
Term = 6 years	1.24%	1.40%	1.62%	**1.78%**
Impact of Earnings Sharing				
3-year plans, ESM				
No Sharing	0.64%	0.79%	0.87%	0.94%
Company Share = 75%	0.43%	0.63%	0.70%	0.81%
Company Share = 50%	0.34%	0.47%	0.56%	0.67%

Company Share = 25%	0.20%	0.37%	0.46%	0.55%
6-year plans, ESM				
No Sharing	1.24%	1.40%	1.62%	1.78%
Company Share = 75%	1.00%	1.28%	1.52%	1.49%
Company Share = 50%	0.78%	1.03%	1.23%	1.28%
Company Share = 25%	0.87%	1.02%	1.01%	1.11%
Impact of Partial Plan Update Externalization				
3-Year Plans, Extern				
Externalized Percentage = 0%	0.64%	0.79%	0.87%	0.94%
Externalized Percentage = 10%	1.83%	2.01%	2.19%	2.65%
Externalized Percentage = 25%	3.16%	2.82%	2.96%	3.42%
Externalized Percentage = 50%	4.78%	3.48%	3.56%	3.85%
6-Year Plans, Extern				
Externalized Percentage = 0%	1.24%	1.40%	1.62%	1.78%
Externalized Percentage = 10%	1.43%	1.83%	2.16%	2.27%
Externalized Percentage = 25%	3.14%	2.95%	3.24%	3.44%
Externalized Percentage = 50%	4.37%	3.10%	3.48%	3.73%

Initial inefficiency = 5%	Average Annual Performance Gain			
	1st Rate Cycle	2nd rate cycle	3rd rate cycle	Long run
Reference Regulatory Options				
2 Year Cost of Service	0.28%	0.24%	0.32%	0.64%
3 Year Cost of Service	0.37%	0.86%	1.11%	0.93%
Full Rate Externalization	4.24%	3.90%	3.96%	4.05%
Impact of Plan Term				
Term = 3 years	0.37%	0.86%	1.11%	**0.93%**
Term = 6 years	1.10%	1.33%	1.47%	**1.71%**
Impact of Earnings Sharing				
3-year plans, ESM				
No Sharing	0.37%	0.86%	1.11%	0.93%
Company Share = 75%	0.39%	0.50%	0.66%	0.78%
Company Share = 50%	0.19%	0.46%	0.51%	0.64%
Company Share = 25%	0.17%	0.26%	0.42%	0.55%
6-year plans, ESM				
No Sharing	1.10%	1.33%	1.47%	1.71%
Company Share = 75%	0.86%	1.18%	1.41%	1.44%
Company Share = 50%	0.81%	0.94%	1.15%	1.23%
Company Share = 25%	0.70%	0.78%	0.94%	1.04%
Impact of Partial Plan Update Externalization				
3-Year Plans, Extern				
Externalized Percentage = 0%	0.37%	0.86%	1.11%	0.93%
Externalized Percentage = 10%	1.62%	1.84%	2.07%	2.57%
Externalized Percentage = 25%	2.76%	2.61%	2.76%	3.30%
Externalized Percentage = 50%	4.27%	3.17%	3.33%	3.77%
6-Year Plans, Extern				
Externalized Percentage = 0%	1.10%	1.33%	1.47%	1.71%
Externalized Percentage = 10%	1.21%	1.70%	2.03%	2.17%
Externalized Percentage = 25%	2.79%	2.79%	3.13%	3.34%
Externalized Percentage = 50%	3.81%	3.51%	3.69%	3.85%

Initial inefficiency = 0%	Average Annual Performance Gain			
	1st Rate Cycle	2nd rate cycle	3rd rate cycle	Long run
Reference Regulatory Options				
2 Year Cost of Service	0.23%	0.24%	0.21%	0.61%
3 Year Cost of Service	0.37%	0.62%	0.75%	0.91%
Full Rate Externalization	3.78%	3.64%	3.82%	3.93%
Impact of Plan Term				
Term = 3 years	0.37%	0.62%	0.75%	**0.91%**
Term = 6 years	0.96%	1.23%	1.40%	**1.66%**
Impact of Earnings Sharing				
3-year plans, ESM				
No Sharing	0.37%	0.62%	0.75%	0.91%
Company Share = 75%	0.28%	0.42%	0.55%	0.76%
Company Share = 50%	0.15%	0.36%	0.47%	0.62%
Company Share = 25%	0.11%	0.20%	0.39%	0.53%
6-year plans, ESM				
No Sharing	0.96%	1.23%	1.40%	1.66%
Company Share = 75%	0.68%	1.10%	1.35%	1.39%
Company Share = 50%	0.60%	0.84%	1.14%	**1.20%**
Company Share = 25%	0.58%	0.72%	0.95%	0.99%
Impact of Partial Plan Update Externalization				
3-Year Plans, Extern				
Externalized Percentage = 0%	0.37%	0.62%	0.75%	0.91%
Externalized Percentage = 10%	1.40%	1.68%	1.91%	2.47%
Externalized Percentage = 25%	2.44%	2.30%	2.61%	3.16%
Externalized Percentage = 50%	3.75%	2.84%	3.13%	3.64%
6-Year Plans, Extern				
Externalized Percentage = 0%	0.96%	1.23%	1.40%	1.66%
Externalized Percentage = 10%	1.02%	1.54%	1.83%	2.08%
Externalized Percentage = 25%	2.42%	2.60%	3.04%	3.21%
Externalized Percentage = 50%	3.40%	3.28%	3.57%	3.69%

UNDERTAKING JTB.35

Tr: 134

DR. LOWRY TO RESPOND TO CCC/VECC'S QUESTION NO. 1

RESPONSE:

Please see the attached listing of the files included in our working papers. Most files can be opened in Excel or a text editor such a Microsoft Word. There are a few .sav files that can only be open in the SST program included in section 3.4. For each of those files, a .dbf version of the files was provided that can be opened with Excel.

The files in section 3.5 contain C++ program code and a data file specific to that program. This is only relevant to the incentive power model portion of our work. Access to these working papers requires the signing of a confidentiality agreement.

The summary rate trends were calculated using PEG's statistical software package SST provided in section 3.4 of the working papers. It can be run under windows via the command prompt. The SST program code for Enbridge is a text file named Enbridge_indexing_code.prg and can found in section 1.1 of the working papers. The SST program code for Union is a text file named Union_indexing_code.prg found in section 1.2 of the working papers. The relevant portion of the program related to the rate index calculations is the section titled "Revenue Weighted Output Price and Quantity Indexes". Please note that access to section 3.4 of the working paper requires the signing of a confidentiality agreement.

WITNESSES:

Mark Lowry

Files included in PEG's Workir

Section of Working Papers	Subsection	
1 Enbridge and Union Data	1.1 Enbridge Working Papers	
	1.2 Union Working Papers	
2 Statistics Canada Data	2.1 Broad Inflation Measures	
	2.2 Labour Cost Indexes	
	2.3 MFP Indexes	
	2.4 Other Indexes	
	2.5 Construction Cost	
	2.6 Inflation Differential	
3 U.S. LDC Data, Programs, and Results	3.1 U.S. TFP	3.1.1
		3.1.2

3.2 Econometric Model 3.2.1

3.2.2

3.3 Weather

3.4 SST (Confidential)

all files can be accessed as part of installation of SST

3.5 Incentive Power (Confidential)

4	Miscellaneous Documents	4.1	BLS MFP Data
		4.2	Company Names

*All files in .sav format have a duplicate file in .dbf format.

ıg Papers (Enbridge Question 2)

filename	program to open
awe.dbf	Excel
CanadianCorporateLongTermBonds.dbf	Excel
canreturn.dbf	Excel
DSMvolume.dbf	Excel
Enbridge Code Key.xls	Excel
Enbridge_indexing_code.prg	Word or Other Text Editor
enbridgedata2.dbf	Excel
gdppicpi.dbf	Excel
panel3505.dbf	Excel
Rateclass.dbf	Excel
Rateclass_actual_normalized5.dbf	Excel
wkagas2.dbf	Excel
wkagas.dbf	Excel
awe.dbf	Excel
CanadianCorporateLongTermBonds.dbf	Excel
Customers_by_rateclass.dbf	Excel
DSMvolumes.dbf	Excel
gdppicpi.dbf	Excel
panel4505b.dbf	Excel
rev_yv_by_DxType.dbf	Excel
Txrates.dbf	Excel
Union Code Key.xls	Excel
Union_indexing_code.prg	Word or Other Text Editor
uniondata2.dbf	Excel
wkagas2.dbf	Excel
wkagas.dbf	Excel
yvretnormalized.dbf	Excel
(2.1) GDP IPI.xls	Excel
(2.2) Labour Indexes.xls	Excel
(2.3) MFP Data.xls	Excel
(2.4) Canadian Data.xls	Excel
(2.5) Construction Price.xls	Excel
(2.6) Input Price Differential.xls	Excel
usdata.dbf	Excel
usdata.sav	SST*
cos indexi file.xls	Excel
cosamppeer.dbf	Excel
customerelasticities.dbf	Excel
customerelasticities.sav	SST*
customerelasticities_COS.sav	SST*
customerelasticities_COS.dbf	Excel
gd indexi file.xls	Excel
gdsamppeer.dbf	Excel
ustfp.prg	Word or Other Text Editor
ustfpgd.txt	Word or Other Text Editor

ustfpgd.prg	Word or Other Text Editor
oebgas5.xls	Excel
oebgasCS.xls	Excel
DR_TC	Word or Other Text Editor
econometric cost model COS	Word or Other Text Editor
econometric cost model GD	Word or Other Text Editor
Est_SLM2.inc	Word or Other Text Editor
Est_SM3.inc	Word or Other Text Editor
id	Word or Other Text Editor
IDs	Word or Other Text Editor
modeloeb.inc	Word or Other Text Editor
Print2004.inc	Word or Other Text Editor
R_square2.inc	Word or Other Text Editor
R_square3.inc	Word or Other Text Editor
readme.txt	Word or Other Text Editor
SOCs_2.inc	Word or Other Text Editor
SOCs_3.inc	Word or Other Text Editor
SURH3UP.src	Word or Other Text Editor
var_nameoebgas.inc	Word or Other Text Editor
EnbridgeGas weathernorm WP.xls	Excel
readme.txt	Word or Other Text Editor
UnionGas weathernorm WP.xls	Excel
wAdj.xls	Excel
wAdj.out	Word or Other Text Editor
wAdj.prg	Word or Other Text Editor
weathernorm.xls	Excel
_DEIREG.ISR	SST Program Files
_ISREG32.DLL	SST Program Files
BKW	SST Program Files
bkw.sav	SST Program Files
CALC	SST Program Files
CVTSAV	SST Program Files
DeIsL1.isu	SST Program Files
DEMO	SST Program Files
LIST	SST Program Files
READ.ME	SST Program Files
SST	SST Program Files
SST	SST Program Files
SST	SST Program Files
SST	SST Program Files
SSTJET	SST Program Files
X	Word or Other Text Editor
X	Word or Other Text Editor
main.cpp	Microsoft's Visual C++ 2005 Express Edition
parameters.dat	Word or Other Text Editor
8212007 Enbridge results (2nd edition).xls	Excel

(4.1) US MFP Data	Excel
(4.2) Company Names	Excel

UNDERTAKING JTB.36

Tr: 140

DR. LOWRY TO PROVIDE A WRITTEN RESPONSE TO CCC/VECC QUESTION 7

RESPONSE:

Dr. Lowry has interpreted this question to mean that the IPD could be revised annually to reflect the difference between moving averages of GDP-PI and the industry-specific input price index. Below are Dr. Lowry's comments.

- This approach is a conceptually valid alternative to the approach used in our study.
- However, this approach would require the ongoing computation of an industry-specific input price index. If this were being computed, one wonders why one would not just use this index as the inflation measure (possibly in smoothed for) and dispense with the GDPIPI altogether.
- Even with smoothing this approach could materially destabilize the X factor if the capital price was calculated using the geometric decay method.

WITNESSES:

Mark Lowry

UNDERTAKING JTB.37

Tr: 145

DR. LOWRY TO PROVIDE WRITTEN RESPONSE TO CCC/VECC QUESTION NO. 11

RESPONSE:

The file ustfp.prg (found in working paper folder 3.1.2) is a text file that has the program code which produced the US TFP calculations. It can be opened by notepad, wordpad or word. It uses the sst software to produce the calculations. With regard to the company specific elasticities used to determine each company's TFP, these elasticities are determined by taking into account the company specific business conditions. For example, assuming these are the only two customer number related variables in the model, which are the log of mean-scaled customer numbers and the square of this variable, when we consider the elasticity of customers for a given company n, in time period t, we use the derivative of the log of cost with respect to the log of the mean-scaled number of customers, which results in the following equation:

$\alpha_{yn} + \alpha_{ynyn} * \ln\left(\frac{Y_{nt}}{\overline{Y_n}}\right)$ where the alpha terms are the parameters of the first and second order terms of customer numbers, $\overline{Y_n}$ is the mean value of customers, and Y_{nt} is the nth firm value of customers in year t. Using the parameter estimates from the cost model and company n's customer numbers in year t, we produce a year t specific customer elasticity. We then average the yearly values of these elasticities for this company to produce the company specific elasticity, which we use to form an elasticity weighted output index for company n. One thing to note here is that there are more than two output related variables in the model so that the derivative used to evaluate the elasticity has more terms than the ones given above.

WITNESSES:

Mark Lowry

UNDERTAKING JTB.38

Tr: 145

DR. LOWRY TO ADVISE THE VERSION OF GAUSS USED

RESPONSE:

GAUSS version 8.0 was used. Please note though, earlier work was produced using GAUSS version 4.0 and since that program is still installed on the machine where version 8.0 is run, we are still able to execute some of the obsolete commands in this latter version that are used in version 4.0. In particular, the commands for exporting and importing files, export, exportf, import, and importf, still work with version 8.0 although they are technically no longer supported by this version.

WITNESSES:

Mark Lowry

UNDERTAKING JTB.39

Tr: 152

DR. LOWRY TO PROVIDE FULL DETAILS OF THE TRANS LOG MODEL

RESPONSE:

Attached are full details of two translog models. JTB.39 (1) provides model estimates, of the cost and the share equations, regulatory conditions of the model and company specific output elasticities of our model with three output specifications with the interaction terms of all outputs included. JTB.39 (2) provides the same details but for a two output model specification, where residential and commercial deliveries and other deliveries are combined into one delivery variable. The former differs from the model we provide in our June report in that the interaction terms for outputs are included while the latter is a replication of the Carpenter model.

WITNESSES:

Mark Lowry

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Date: 10/08/07 **** STANDARD SUR ESTIMATION RESULTS **** Time: 10:31:09

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

DATA FILE:C:\work\Oebgas\oebgasCS.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

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: 78
Number of variables written to GAUSS data set: 26
1
409

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SEEMINGLY UNRELATED REGRESSION WITH HETEROSKEDASTICITY 10/08/2007 10:31 am

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Data Set: C:\work\Oebgas\Temp_3.dat

DIVISOR USING N IN EFFECT
RESTRICTIONS IN EFFECT

ITER. # = 0 LOG OF DETERMINANT OF SIGMA = 4.84048924
ITER. # = 1 LOG OF DETERMINANT OF SIGMA = 4.78641485
ITER. # = 2 LOG OF DETERMINANT OF SIGMA = 4.78581075
ITER. # = 3 LOG OF DETERMINANT OF SIGMA = 4.78578368
ITER. # = 4 LOG OF DETERMINANT OF SIGMA = 4.78578200
ITER. # = 5 LOG OF DETERMINANT OF SIGMA = 4.78578189
ITER. # = 6 LOG OF DETERMINANT OF SIGMA = 4.78578188
ITER. # = 7 LOG OF DETERMINANT OF SIGMA = 4.78578188

Equation: 1
Dependent variable: C

Total cases: 396 Valid cases: 396
Total SS: 316.532 Degrees of freedom: ----
R-squared: 0.974 Rbar-squared: 0.974
Residual SS: 8.121 Std error of est: 2.221
Durbin-Watson: 0.347

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	8.11809175	0.02306365	351.986	0.0000
WL	0.23605702	0.01585194	14.891	0.0000
WK	0.53138948	0.00621337	85.524	0.0000
Y1	0.67483085	0.03686433	18.306	0.0000
Y2	0.10003970	0.03077961	3.250	0.0013
Y3	0.09666671	0.01991652	4.854	0.0000
WLWL	-0.40821362	0.14143073	-2.886	0.0041
WLWK	-0.10249367	0.01426584	-7.185	0.0000

WKWK	0.16423028	0.01368402	12.002	0.0000
Y1Y1	0.25147825	0.19683611	1.278	0.2022
Y2Y2	-0.60266171	0.17047258	-3.535	0.0005
Y3Y3	0.12916344	0.01995289	6.473	0.0000
WLY1	0.01552924	0.01251090	1.241	0.2153
WLY2	-0.03858680	0.01139864	-3.385	0.0008
WLY3	0.01502433	0.00424802	3.537	0.0005
WKY1	-0.06408360	0.01412834	-4.536	0.0000
WKY2	0.04540437	0.01329651	3.415	0.0007
WKY3	0.01543813	0.00405448	3.808	0.0002
Y1Y2	0.17723297	0.17174690	1.032	0.3028
Y1Y3	-0.24457212	0.05610306	-4.359	0.0000
Y2Y3	0.12520889	0.05004619	2.502	0.0128
Z1	-0.67710802	0.05586530	-12.120	0.0000
Z2	-0.00664999	0.00106825	-6.225	0.0000
Z3	0.03626606	0.01364240	2.658	0.0082
TREND	-0.01232500	0.00215105	-5.730	0.0000
WLTREND	0.00166913	0.00303431	0.550	0.5826
WKTREND	0.00672559	0.00099995	6.726	0.0000

Equation: 2
Dependent variable: SL

Total cases:	396	Valid cases:	396
Total SS:	2.247	Degrees of freedom:	----
R-squared:	0.112	Rbar-squared:	0.130
Residual SS:	1.996	Std error of est:	2.363
Durbin-Watson:	0.406		

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	0.23605702	0.01585194	14.891	0.0000
WL	-0.40821362	0.14143073	-2.886	0.0041
WK	-0.10249367	0.01426584	-7.185	0.0000
Y1	0.01552924	0.01251090	1.241	0.2152
Y2	-0.03858680	0.01139864	-3.385	0.0008
Y3	0.01502433	0.00424802	3.537	0.0005
TREND	0.00166913	0.00303431	0.550	0.5826

Equation: 3
Dependent variable: SK

Total cases: 396 Valid cases: 396
Total SS: 2.617 Degrees of freedom: ----
R-squared: 0.227 Rbar-squared: 0.242
Residual SS: 2.024 Std error of est: 2.852
Durbin-Watson: 0.322

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	0.53138948	0.00621337	85.524	0.0000
WL	-0.10249367	0.01426584	-7.185	0.0000
WK	0.16423028	0.01368402	12.002	0.0000
Y1	-0.06408360	0.01412834	-4.536	0.0000
Y2	0.04540437	0.01329651	3.415	0.0007
Y3	0.01543813	0.00405448	3.808	0.0002
TREND	0.00672559	0.00099995	6.726	0.0000

Equation: 4
Dependent variable: SM

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

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	0.23255350	0.01596728	14.564	0.0000
WL	0.51070729	0.14183005	3.601	0.0004
WK	-0.06173660	0.01308248	-4.719	0.0000
Y1	0.04855436	0.01256171	3.865	0.0001
Y2	-0.00681756	0.01167723	-0.584	0.5600
Y3	-0.03046246	0.00379414	-8.029	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
1598.028	+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	0
(0.00 %)	(0.00 %)	(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 %)

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

sum	yn	yvrc	yvoth	utility
0.650	0.974	-0.438	0.114	ENBRIDGE
0.679	0.900	-0.365	0.144	NICOR
0.690	0.972	-0.345	0.062	Peoples Gas Light
0.725	0.873	-0.270	0.122	Consumers Power
0.727	0.883	-0.264	0.108	Public Service Electric & Gas
0.743	0.844	-0.207	0.106	East Ohio Gas
0.758	1.251	-0.356	-0.137	Washington Gas Light
0.765	0.890	-0.179	0.054	Consolidated Edison
0.781	0.229	0.131	0.421	UNION GAS
0.792	0.557	0.028	0.207	Niagra Mohawk
0.811	0.818	-0.122	0.116	Pacific Gas & Electric
0.837	0.854	-0.100	0.082	SOUTHERN CALIFORNIA GAS
0.866	0.695	0.142	0.029	Connecticut Natural Gas
0.868	0.761	0.053	0.055	Questar (Mountain Fuel Supply)
0.872	0.838	0.003	0.031	Atlanta Gas Light
0.875	0.808	0.061	0.006	Washington Natural Gas
0.891	0.785	0.111	-0.005	People's Natural Gas
0.895	0.628	0.224	0.043	North Shore Gas
0.898	0.683	0.162	0.053	Peco (Philadelphia Electric)
0.903	0.602	0.198	0.103	Wisconsin Gas
0.907	0.687	0.197	0.023	COMMONWEALTH GAS
0.914	0.869	0.118	-0.072	new Jersey Natural Gas
0.917	0.758	0.179	-0.020	Rochester Gas and Electric
0.918	0.733	0.162	0.022	BALTIMORE GAS & ELECTRIC CO
0.939	0.370	0.401	0.167	Pg Energy (Penn Gas & Water)
0.939	0.387	0.413	0.138	Orange & Rockland Utilities
0.947	0.593	0.289	0.065	Illinois Power
0.961	0.502	0.349	0.110	Northwest Natural Gas
0.962	0.704	0.222	0.035	Southwest Gas
0.971	0.644	0.316	0.012	Louisville Gas and Electric
0.974	0.659	0.346	-0.031	Madison Gas & Electric
0.986	0.518	0.424	0.044	Connecticut Energy
1.007	0.468	0.448	0.091	Alabama Gas
1.023	0.516	0.457	0.049	Public Service of North Carolina
1.029	0.376	0.558	0.095	Wisconsin Power & Light

1.055	-0.022	0.780	0.296	Cascade Natural Gas
1.056	0.213	0.717	0.126	Central Hudson Gas
1.076	0.543	0.517	0.015	SAN DIEGO GAS & ELECTRIC

****

Date: 10/08/07 **** STANDARD SUR ESTIMATION RESULTS **** Time: 10:36:31

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

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

****

DEFINITIONS OF OUTPUT VARIABLES:

Y1 is number of customers.

Y2 is weather adjusted deliveries-yvrc is adjusted

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: 78
Number of variables written to GAUSS data set: 26

1
409

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SEEMINGLY UNRELATED REGRESSION WITH HETEROSKEDASTICITY 10/08/2007 10:36 am

==========

Data Set: C:\work\Oebgas\Temp_3.dat

DIVISOR USING N IN EFFECT
RESTRICTIONS IN EFFECT

ITER. # = 0 LOG OF DETERMINANT OF SIGMA = 5.45673495
ITER. # = 1 LOG OF DETERMINANT OF SIGMA = 5.40252613
ITER. # = 2 LOG OF DETERMINANT OF SIGMA = 5.40223023
ITER. # = 3 LOG OF DETERMINANT OF SIGMA = 5.40222789
ITER. # = 4 LOG OF DETERMINANT OF SIGMA = 5.40222785
ITER. # = 5 LOG OF DETERMINANT OF SIGMA = 5.40222785
ITER. # = 6 LOG OF DETERMINANT OF SIGMA = 5.40222785

Equation: 1
Dependent variable: C

Total cases: 396 Valid cases: 396
Total SS: 316.532 Degrees of freedom: ----
R-squared: 0.966 Rbar-squared: 0.966
Residual SS: 10.612 Std error of est: 2.778
Durbin-Watson: 0.252

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	8.06813784	0.02542913	317.279	0.0000
WL	0.20747324	0.01573849	13.183	0.0000
WK	0.51981116	0.00622370	83.521	0.0000
Y1	0.72765444	0.04862758	14.964	0.0000
Y2	0.12682357	0.04732174	2.680	0.0077
WLWL	-0.72683070	0.13886808	-5.234	0.0000
WLWK	-0.12934372	0.01416952	-9.128	0.0000
WKWK	0.14550563	0.01367611	10.639	0.0000
Y1Y1	0.10448682	0.12110429	0.863	0.3888
Y2Y2	0.13492351	0.13873745	0.973	0.3314
WLY1	-0.04211028	0.01101370	-3.823	0.0002

WLY2	0.04172775	0.01165434	3.580	0.0004
WKY1	-0.04571927	0.00844801	-5.412	0.0000
WKY2	0.04170354	0.00905190	4.607	0.0000
Y1Y2	-0.12407749	0.12037080	-1.031	0.3033
Z1	-0.47856612	0.04670544	-10.246	0.0000
Z2	-0.00956978	0.00117229	-8.163	0.0000
Z3	0.04121271	0.01617248	2.548	0.0112
TREND	-0.01365456	0.00228253	-5.982	0.0000
WLTREND	0.00866183	0.00292301	2.963	0.0032
WKTREND	0.00691851	0.00096085	7.200	0.0000

Equation: 2

Dependent variable: SL

Total cases:	396	Valid cases:	396
Total SS:	2.247	Degrees of freedom:	----
R-squared:	0.088	Rbar-squared:	0.104
Residual SS:	2.050	Std error of est:	2.542
Durbin-Watson:	0.385		

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	0.20747324	0.01573849	13.183	0.0000
WL	-0.72683070	0.13886808	-5.234	0.0000
WK	-0.12934372	0.01416952	-9.128	0.0000
Y1	-0.04211028	0.01101370	-3.823	0.0002
Y2	0.04172775	0.01165434	3.580	0.0004
TREND	0.00866183	0.00292301	2.963	0.0032

Equation: 3

Dependent variable: SK

Total cases:	396	Valid cases:	396
Total SS:	2.617	Degrees of freedom:	----
R-squared:	0.215	Rbar-squared:	0.229
Residual SS:	2.054	Std error of est:	2.921
Durbin-Watson:	0.319		

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	0.51981116	0.00622370	83.521	0.0000
WL	-0.12934372	0.01416952	-9.128	0.0000
WK	0.14550563	0.01367611	10.639	0.0000
Y1	-0.04571927	0.00844801	-5.412	0.0000
Y2	0.04170354	0.00905190	4.607	0.0000
TREND	0.00691851	0.00096085	7.200	0.0000

Equation: 4
Dependent variable: SM

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

Variable	Estimated Coefficient	Standard Error	t-ratio	Prob >|t|
CONST	0.27271560	0.01557989	17.504	0.0000
WL	0.85617442	0.13782580	6.212	0.0000
WK	-0.01616191	0.01267971	-1.275	0.2039
Y1	0.08782955	0.00927345	9.471	0.0000
Y2	-0.08343129	0.00977470	-8.535	0.0000

MEASURES OF GOODNESS-OF-FIT

AN UNCENTERED SYSTEM R-SQUARE 0.975

A CENTERED SYSTEM R-SQUARE 0.977

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
1496.278	0.0000

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	0
(0.00 %)	(0.00 %)	(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 %)

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

sum	yn	yvrc	yvoth	utility
0.837	0.703	0.134		SOUTHERN CALIFORNIA GAS
0.842	0.696	0.145		Pacific Gas & Electric

0.848	0.761	0.087	Atlanta Gas Light
0.849	0.701	0.148	Public Service Electric & Gas
0.849	0.685	0.164	NICOR
0.849	0.678	0.171	ENBRIDGE
0.850	0.766	0.084	Southwest Gas
0.850	0.701	0.150	Consolidated Edison
0.851	0.708	0.143	Consumers Power
0.851	0.700	0.151	East Ohio Gas
0.852	0.767	0.085	SAN DIEGO GAS & ELECTRIC
0.852	0.757	0.095	Washington Gas Light
0.855	0.697	0.158	Peoples Gas Light
0.855	0.757	0.098	Washington Natural Gas
0.856	0.765	0.090	BALTIMORE GAS & ELECTRIC CO
0.856	0.774	0.082	new Jersey Natural Gas
0.857	0.762	0.095	Questar (Mountain Fuel Supply)
0.859	0.736	0.124	Wisconsin Gas
0.859	0.739	0.121	Alabama Gas
0.860	0.730	0.130	Northwest Natural Gas
0.860	0.754	0.106	Peco (Philadelphia Electric)
0.860	0.755	0.105	Illinois Power
0.861	0.766	0.094	People's Natural Gas
0.861	0.769	0.092	Rochester Gas and Electric
0.862	0.776	0.086	Public Service of North Carolina
0.862	0.786	0.076	Louisville Gas and Electric
0.863	0.678	0.185	Niagra Mohawk
0.864	0.757	0.108	COMMONWEALTH GAS
0.867	0.511	0.356	UNION GAS
0.868	0.757	0.111	Connecticut Energy
0.870	0.738	0.132	North Shore Gas
0.870	0.758	0.112	Wisconsin Power & Light
0.871	0.730	0.141	Connecticut Natural Gas
0.872	0.787	0.084	Madison Gas & Electric
0.874	0.729	0.146	Pg Energy (Penn Gas & Water)
0.875	0.712	0.162	Orange & Rockland Utilities
0.878	0.737	0.142	Central Hudson Gas
0.879	0.620	0.259	Cascade Natural Gas

UNDERTAKING JTB.40

Tr: 155

DR. LOWRY TO REVISE THE INPUT PRICE DIFFERENTIAL CALCULATIONS FOR UNION, IF NEEDED, WITH REGARD TO THE NATURAL GAS COMPONENT

RESPONSE:

Now that Mark Lowry is aware of the special ratemaking treatment of system gas cost, PEG will exclude system gas from the input price differential (IPD) calculation in its final report.

WITNESSES:

Mark Lowry

UNDERTAKING JTB.43

Tr: 170

DR. LOWRY TO PROVIDE A RESPONSE TO IGUA QUESTION NO. 10

RESPONSE:
Mark Lowry is familiar with some revenue cap plans but has not done a systematic review of these plans, which have proliferated recently to deal with declining average use challenges in the gas utility industry. In his response to IGUA 2 he mistakenly referred to Southern California *Edison* when he meant to say Southern California *Gas*.

Attached please find PDFs for the California Public Utilities Commission decisions approving revenue caps for Southern California Gas in 1997 and Southern California Gas & San Diego Gas and Electric jointly in 2004 and 2005.

WITNESSES:

Mark Lowry

UNDERTAKING JTB.48

Tr: 194

DR. LOWRY TO PROVIDE AN ANSWER TO UNION QUESTION NO. 3

RESPONSE:

Enbridge IR #9(b) asks PEG to provide the complete details of how possible heteroscedasticity and autocorrelation adjustments, if performed, were done. In this part, PEG assumes that Union is asking how initial residuals were computed to adjust for groupwise heteroscedasticity and we answer accordingly. The initial residuals used in computing the weights for heteroscedasticity adjustment were based on OLS regressions of all three equations, done one equation at a time, but without imposing any restrictions on the estimates.

WITNESSES:

Mark Lowry

UNDERTAKING JTB.49

Tr: 194

DR. LOWRY TO PROVIDE AN ANSWER TO UNION QUESTION NO. 4

RESPONSE:

The answer is partly yes. First of all, the weights used to transform each equation was based on its own residuals; that is, the weights used to transform the cost function were derived from the residuals of the cost function while the weights used to transform the labor share equation were derived from the residuals of the labor share equation. In particular, the weighting matrix is calculated based on the following:

1. Get OLS parameter estimates for each equation.

2. Get OLS residuals for each equation.

3. Get the weights used to transform the data so as to adjust for groupwise heteroscedasticity. The general methodology for obtaining the weights is to form equation-by-equation $e_i' e_i / n_i$, where e_i is group $i's$ residual vector and n_i is the number of observations in each group or cross-section (in the current case 11). However, we use a more refined approach to obtain the weights based on a mean differenced residual vector such that the weight used for each group is based on $(e_i - \bar{e})'(e_i - \bar{e})/n_i$, where $\bar{e}$ is the mean value of group $i's$ residual vector.

4. Transform the data by dividing the data matrix for each equation using the square root of the corresponding weighting vector.

WITNESSES:

Mark Lowry