

Gas Customer models:

Residential heating customers

System: T_SYS01_GASRESCUST_LOG				
Estimation Method: Iterative Seemingly Unrelated Regression				
Sample: 2001M04 2009M03				
Included observations: 96				
Total system (balanced) observations 192				
Simultaneous weighting matrix & coefficient iteration				
Dependent Variable: LOG(GASRESCUST_HT)	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-Statistic</u>	<u>Prob.</u>
Odd Months	-0.61400	0.24660	-2.48986	0.01371
Even Months	-0.59582	0.24577	-2.42428	0.01635
January	0.04934	0.00372	13.26120	0.00000
LOG(GASRESCUST_HT [-2])	0.83454	0.03606	23.14101	0.00000
LOG(HOUSEHOLDSGAS)	0.51138	0.11631	4.39654	0.00002
March, 2005	-0.02434	0.00922	-2.64089	0.00901
November starting 11/08	0.01290	0.00772	1.67139	0.09642
December starting 12/08	0.02492	0.00718	3.47079	0.00065
January starting 1/09	**			
R-squared	0.98233	Mean dependent var	10.81467	
Adjusted R-squared	0.98092	S.D. dependent var	0.06835	
S.E. of regression	0.00944	Sum squared resid	0.00784	
Durbin-Watson stat	2.17326			
Residual correlation:	0.71285			
Key: [-t] indicates lag of t months				
** Constrained value, negates estimated net change in the number of customers during the prior two months.				

- Odd Months is a dummy variable, taking a value of one in the months of January/March/May/July/September/November, and zero otherwise;
- Even Months is a dummy variable, taking a value of one in the months of February/April/June/August/October/December, and zero otherwise;
- January is a dummy variable, taking a value of one in that month, and zero otherwise;
- GASRESCUST_HT [-2] is the dependent variable lagged two months;
- HOUSEHOLDSGAS is Central Hudson’s gas sales-weighted calculation of households, using county-specific data from Economy.com;

- March, 2005 is a dummy variable taking a value of one in that month/year, and zero otherwise;
- November starting 11/08, December starting 12/08, and January starting 1/09 are dummy variables taking a value of one in the named month for all years commencing with 2008 (2009).

Residential non-heating customers

System: T_SYS01_GASRESCUST_LOG
 Estimation Method: Iterative Seemingly Unrelated Regression

Sample: 2001M04 2009M03
 Included observations: 96
 Total system (balanced) observations 192
 Simultaneous weighting matrix & coefficient iteration

Dependent Variable: LOG(GASRESCUST_NH)	Coefficient	Std. Error	t-Statistic	Prob.
Odd Months	1.42240	0.41406	3.43528	0.00074
Even Months	1.46596	0.42404	3.45712	0.00068
January	0.05931	0.00548	10.83304	0.00000
LOG(GASRESCUST_NH [-2])	0.86027	0.04140	20.77891	0.00000
SH Cust / HH Ratio	-0.00035	0.00010	-3.51862	0.00055
March, 2005	-0.03707	0.01342	-2.76282	0.00634
November starting 11/08	0.01429	0.01121	1.27467	0.20411
December starting 12/08	0.03013	0.01013	2.97414	0.00335
January starting 1/09	**			
R-squared	0.98470	Mean dependent var		9.22317
Adjusted R-squared	0.98349	S.D. dependent var		0.10600
S.E. of regression	0.01362	Sum squared resid		0.01633
Durbin-Watson stat	2.16808			
Residual correlation:	0.71285			

Key: [-t] indicates lag of t months

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- Even Months is a dummy variable, taking a value of one in the months of February/April/June/August/October/December, and zero otherwise;
- January is a dummy variable, taking a value of one in that month, and zero otherwise;
- GASRESCUST_NH [-2] is the dependent variable lagged two months;
- SH CUST / HH Ratio is the current saturation of gas space heating;
- March, 2005 is a dummy variable taking a value of one in that month/year, and zero otherwise;
- November starting 11/08, December starting 12/08, and January starting 1/09 are dummy variables taking a value of one in the named month for all years commencing with 2008 (2009).

Commercial heating customers

Dependent Variable: LOG(GASCOMCUST_HT)

Method: Least Squares

Sample: 2001M04 2009M03

Included observations: 96

	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-Statistic</u>	<u>Prob.</u>
Even Months	0.04473	0.00458	9.75990	0.00000
January	0.01885	0.00460	4.09988	0.00009
March	0.01165	0.00422	2.76217	0.00700
December	0.01108	0.00410	2.69934	0.00835
LOG(GASCOMCUST_HT [-12])	0.61141	0.04173	14.65081	0.00000
LOG(Emp. NonMan. [-1])	0.79475	0.08487	9.36419	0.00000
February, 2009	0.03629	0.01079	3.36418	0.00114
November starting 11/08	0.02215	0.00877	2.52548	0.01337
December starting 12/08	0.00766	0.00834	0.91881	0.36073
January starting 1/09	**			
R-squared	0.98469	Mean dependent var	8.97337	
Adjusted R-squared	0.98328	S.D. dependent var	0.07835	
S.E. of regression	0.01013	Akaike info criterion	-6.25744	
Sum squared resid	0.00893	Schwarz criterion	-6.01703	
Log likelihood	309.35692	Durbin-Watson stat	2.07565	

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- January is a dummy variable, taking a value of one in that month, and zero otherwise;
- March is a dummy variable, taking a value of one in that month, and zero otherwise;
- December is a dummy variable, taking a value of one in that month, and zero otherwise;
- GASCOMCUST_HT [-12] is the dependent variable lagged twelve months;
- Emp. NonMan [-1] is Central Hudson's gas sales-weighted calculation of non-manufacturing employment, using county-specific data from Economy.com, lagged one month;
- February, 2009 is a dummy variable taking a value of one in that month/year, and zero otherwise;
- November starting 11/08, December starting 12/08, and January starting 1/09 are dummy variables taking a value of one in the named month for all years commencing with 2008 (2009).

Commercial non-heating customers

Dependent Variable: LOG(GASCOMCUST_NH)

Method: Least Squares

Sample: 2001M04 2009M03

Included observations: 96

	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-Statistic</u>	<u>Prob.</u>
Constant	3.99796	0.63360	6.30987	0.00000
Even Months	0.13220	0.01988	6.65100	0.00000
January	0.03454	0.00768	4.49753	0.00002
LOG(GASCOMCUST_NH [-2])	0.42270	0.09129	4.63041	0.00001
November starting 11/08	0.03479	0.01559	2.23197	0.02810
December starting 12/08	-0.00314	0.01437	-0.21831	0.82768
January starting 1/09	**			
R-squared	0.97414	Mean dependent var	7.04516	
Adjusted R-squared	0.97270	S.D. dependent var	0.11138	
S.E. of regression	0.01840	Akaike info criterion	-5.09215	
Sum squared resid	0.03048	Schwarz criterion	-4.93188	
Log likelihood	250.42324	Durbin-Watson stat	2.13926	

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- January is a dummy variable, taking a value of one in that month, and zero otherwise;
- GASCOMCUST_NH [-2] is the dependent variable lagged two months;
- November starting 11/08, December starting 12/08, and January starting 1/09 are dummy variables taking a value of one in the named month for all years commencing with 2008 (2009).

OPA customers

Dependent Variable: GASOPACUST

Method: Least Squares

Sample: 2001M01 2009M03

Included observations: 99

	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-Statistic</u>	<u>Prob.</u>
Odd Months	658.32229	4.64178	141.82547	0.00000
Even Months	713.89694	5.00473	142.64442	0.00000
March	26.22096	7.25312	3.61513	0.00049
June / August	-24.00408	6.04725	-3.96942	0.00014
Months since December, 2000	0.46647	0.06947	6.71479	0.00000
February, 2003	104.97478	20.06125	5.23271	0.00000
November starting 11/08	7.32469	16.13985	0.45383	0.65103
December starting 12/08	-5.71643	16.36927	-0.34922	0.72773
January starting 1/09	**			
R-squared	0.71752	Mean dependent var	708.71717	
Adjusted R-squared	0.69579	S.D. dependent var	35.66798	
S.E. of regression	19.67265	Akaike info criterion	8.87369	
Sum squared resid	35218.20434	Schwarz criterion	9.08340	
Log likelihood	-431.24774	Durbin-Watson stat	1.94909	

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- Even Months is a dummy variable, taking a value of one in the months of February/April/June/August/October/December, and zero otherwise;
- March is a dummy variable, taking a value of one in that month, and zero otherwise;
- June is a dummy variable, taking a value of one in that month, and zero otherwise;
- August is a dummy variable, taking a value of one in that month, and zero otherwise;
- Months since December, 2000 is a linear trend starting at a value of one in January, 2001;
- February, 2003 is a dummy variable taking a value of one in that month/year, and zero otherwise;
- November starting 11/08, December starting 12/08, and January starting 1/09 are dummy variables taking a value of one in the named month for all years commencing with 2008 (2009).

Industrial customers

Dependent Variable: LOG(GASINDCUST)

Method: Least Squares

Sample: 2001M04 2009M03

Included observations: 96

	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-Statistic</u>	<u>Prob.</u>
Constant	2.88013	0.34728	8.29329	0.00000
January	0.05918	0.00958	6.17606	0.00000
March	0.04004	0.01036	3.86638	0.00021
April	0.02769	0.00917	3.01880	0.00334
December	0.02332	0.00964	2.41940	0.01765
LOG(GASINDCUST [-2])	0.31726	0.07777	4.07966	0.00010
LOG(Emp. Man.)	0.41086	0.05286	7.77297	0.00000
March, 2002	-0.18743	0.02642	-7.09388	0.00000
November starting 11/08	0.02553	0.02039	1.25224	0.21388
December starting 12/08	0.00916	0.02084	0.43951	0.66140
January starting 1/09	**			
R-squared	0.83257	Mean dependent var		5.67753
Adjusted R-squared	0.81505	S.D. dependent var		0.05645
S.E. of regression	0.02428	Akaike info criterion		-4.50037
Sum squared resid	0.05068	Schwarz criterion		-4.23325
Log likelihood	226.01771	Durbin-Watson stat		2.18036

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- January is a dummy variable, taking a value of one in that month, and zero otherwise;
- March is a dummy variable, taking a value of one in that month, and zero otherwise;
- April is a dummy variable, taking a value of one in that month, and zero otherwise;
- December is a dummy variable, taking a value of one in that month, and zero otherwise;
- GASINDCUST [-2] is the dependent variable lagged two months;
- Emp. Man. is Central Hudson's gas sales-weighted calculation of manufacturing employment, using county-specific data from Economy.com;
- March, 2002 is a dummy variable taking a value of one in that month/year, and zero otherwise;
- November starting 11/08, December starting 12/08, and January starting 1/09 are dummy variables taking a value of one in the named month for all years commencing with 2008 (2009).

Gas Sales models:

Residential heating Sales per Customer

Dependent Variable: GASRESUPC_HT				
Method: Least Squares				
Sample: 2001M04 2009M03				
Included observations: 96				
	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-Statistic</u>	<u>Prob.</u>
Odd Months	0.73515	0.08687	8.46236	0.00000
January	-0.86485	0.15510	-5.57614	0.00000
February	1.02018	0.15463	6.59742	0.00000
May	-1.26641	0.14416	-8.78474	0.00000
August	1.21454	0.14133	8.59371	0.00000
November	-1.94069	0.14400	-13.47728	0.00000
“X” – Heating	0.00002	0.00000	85.07216	0.00000
“X” – Other	0.03571	0.00632	5.65353	0.00000
Autoregressive Error [-1]	0.34560	0.09561	3.61480	0.00050
R-squared	0.99647	Mean dependent var		8.07323
Adjusted R-squared	0.99615	S.D. dependent var		5.84088
S.E. of regression	0.36249	Akaike info criterion		0.89741
Sum squared resid	11.43163	Schwarz criterion		1.13782
Log likelihood	-34.07583	Durbin-Watson stat		1.88979
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- January is a dummy variable, taking a value of one in that month, and zero otherwise;
- February is a dummy variable, taking a value of one in that month, and zero otherwise;
- May is a dummy variable, taking a value of one in that month, and zero otherwise;
- August is a dummy variable, taking a value of one in that month, and zero otherwise;
- November is a dummy variable, taking a value of one in that month, and zero otherwise.

Residential non-heating Sales per Customer

Dependent Variable: GASRESUPC_NH

Method: Least Squares

Sample: 2001M04 2009M03

Included observations: 96

	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-Statistic</u>	<u>Prob.</u>
“X” – Other	0.03236	0.00491	6.58988	0.00000
“X” – HH Usage Index	0.00109	0.00013	8.37642	0.00000
Income Elasticity on Income Index	1.02000	** (constrained)		
GASRESUPC_NH [-12]	0.33850	0.08227	4.11466	0.00008
Autoregressive Error [-1]	0.36044	0.09751	3.69640	0.00037
R-squared	0.96180	Mean dependent var		1.69469
Adjusted R-squared	0.96056	S.D. dependent var		0.70731
S.E. of regression	0.14048	Akaike info criterion		-1.04679
Sum squared resid	1.81548	Schwarz criterion		-0.93994
Log likelihood	54.24572	Durbin-Watson stat		2.08781

Key: [-t] indicates lag of t months

** The unrestricted elasticity estimate was 1.59; a restricted value of 1.02 was imposed based on the corresponding regression result in case 08-E-0887.

- GASRESUPC_NH [-12] is the dependent variable lagged twelve months.

Commercial heating Sales per Customer

Dependent Variable: GASCOMUPC_HT

Method: Least Squares

Sample: 2001M04 2009M03

Included observations: 96

	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-Statistic</u>	<u>Prob.</u>
Even Months	-5.58272	0.76893	-7.26040	0.00000
April	-6.37685	1.03592	-6.15573	0.00000
May	-8.89895	1.02794	-8.65710	0.00000
August	5.54706	1.13002	4.90880	0.00000
November	-7.34826	1.01568	-7.23481	0.00000
“X” – Heating	0.05021	0.00048	104.77860	0.00000
“X” – Other	145.80797	7.17141	20.33185	0.00000
February/March 2009 timing	4.27079	2.09123	2.04224	0.04416
Autoregressive Error [-1]	-0.21996	0.10725	-2.05096	0.04328
R-squared	0.99119	Mean dependent var		40.80250
Adjusted R-squared	0.99038	S.D. dependent var		26.34448
S.E. of regression	2.58326	Akaike info criterion		4.82504
Sum squared resid	580.57265	Schwarz criterion		5.06545
Log likelihood	-222.60210	Durbin-Watson stat		1.95729

Key: [-t] indicates lag of t months

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- April is a dummy variable, taking a value of one in that month, and zero otherwise;
- May is a dummy variable, taking a value of one in that month, and zero otherwise;
- August is a dummy variable, taking a value of one in that month, and zero otherwise;
- November is a dummy variable, taking a value of one in that month, and zero otherwise;
- February/March 2009 timing is a dummy variable, taking the value +1 in February 2009, -1 in March 2009, and zero otherwise.

Commercial non-heating Sales per Customer

Dependent Variable: GASCOMUPC_NH				
Method: Least Squares				
Sample: 2001M04 2009M03				
Included observations: 96				
	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-Statistic</u>	<u>Prob.</u>
“X” – Heating	0.00938	0.00151	6.22159	0.00000
“X” – Other	242.73168	28.39607	8.54807	0.00000
Output Elasticity on GDP Index	1.20000	** (constrained)		
April / June / August / October / December	-4.75296	1.43852	-3.30406	0.00136
GASCOMUPC_NH [-12]	0.33922	0.07717	4.39575	0.00003
R-squared	0.77097	Mean dependent var	40.60104	
Adjusted R-squared	0.76350	S.D. dependent var	12.96454	
S.E. of regression	6.30479	Akaike info criterion	6.56127	
Sum squared resid	3657.03549	Schwarz criterion	6.66812	
Log likelihood	-310.94098	Durbin-Watson stat	2.11887	
Key: [-t] indicates lag of t months				
** The unrestricted elasticity estimate was 1.89; a restricted value of 1.20 was imposed based on the corresponding regression result in case 08-E-0887.				

- April is a dummy variable, taking a value of one in that month, and zero otherwise;
- June is a dummy variable, taking a value of one in that month, and zero otherwise;
- August is a dummy variable, taking a value of one in that month, and zero otherwise;
- October is a dummy variable, taking a value of one in that month, and zero otherwise;
- December is a dummy variable, taking a value of one in that month, and zero otherwise;
- GASCOMUPC_NH [-12] is the dependent variable lagged twelve months.

OPA Sales per Customer

Dependent Variable: GASOPAUPC

Method: Least Squares

Sample: 2001M04 2009M03

Included observations: 96

	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-Statistic</u>	<u>Prob.</u>
Odd Months / February / August	11.85527	1.68470	7.03701	0.00000
January / December	24.63142	2.97942	8.26717	0.00000
May	-24.38082	3.70958	-6.57240	0.00000
"X" – Heating	0.11284	0.02536	4.44980	0.00002
Output Elasticity on GDP Index	1.02448	0.03166	32.35620	0.00000
Autoregressive Error [-1]	0.22333	0.10271	2.17443	0.03230
R-squared	0.98662	Mean dependent var		95.01760
Adjusted R-squared	0.98587	S.D. dependent var		77.03676
S.E. of regression	9.15656	Akaike info criterion		7.32728
Sum squared resid	7545.83362	Schwarz criterion		7.48755
Log likelihood	-345.70943	Durbin-Watson stat		2.03332

Key: [-t] indicates lag of t months

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- January is a dummy variable, taking a value of one in that month, and zero otherwise;
- February is a dummy variable, taking a value of one in that month, and zero otherwise;
- May is a dummy variable, taking a value of one in that month, and zero otherwise;
- August is a dummy variable, taking a value of one in that month, and zero otherwise;
- December is a dummy variable, taking a value of one in that month, and zero otherwise.

Industrial Sales per Customer

Sspace: T_SS_GASINDUPC_ALL_TVP
 Method: Maximum likelihood (Marquardt)

Sample: 2002M01 2009M03

Included observations: 87

Dependent Variable: GASINDUPC	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-Statistic</u>	<u>Prob.</u>
Time-Varying Intercept (Random Walk / Final State)	-145.20580	6.28621	-23.09911	0.00000
April	-45.78715	6.19607	-7.38970	0.00000
May	-30.33969	3.87772	-7.82411	0.00000
September	19.39500	5.76873	3.36209	0.00077
“X” – Heating	0.15170	0.00329	46.10597	0.00000
“X” – Other	2174.00522	669.15812	3.24887	0.00116
November/December 2003 timing	66.86201	17.64542	3.78920	0.00015
Log likelihood	-356.80910	Akaike info criterion		8.38642
Parameters	8.00000	Schwarz criterion		8.61317
Diffuse priors	1.00000	Hannan-Quinn criter.		8.47772

- April is a dummy variable, taking a value of one in that month, and zero otherwise;
- May is a dummy variable, taking a value of one in that month, and zero otherwise;
- September is a dummy variable, taking a value of one in that month, and zero otherwise;
- November/December 2003 timing is a dummy variable, taking the value +1 in November 2003, -1 in December 2003, and zero otherwise.