

Kentucky Power Company
 Residential

The ARIMA Procedure

Conditional Least Squares Estimation

Parameter	Estimate	Standard Error	t Value	Approx Pr > |t|	Lag	Variable	Shift
MU	-13.04509	4.53471	-2.88	0.0049	0	USAGE	0
MA1,1	-0.40001	0.09754	-4.10	<.0001	1	USAGE	0
MA1,2	-0.24127	0.09828	-2.45	0.0158	2	USAGE	0
AR1,1	-0.36107	0.10234	-3.53	0.0006	12	USAGE	0
AR1,2	-0.24194	0.11553	-2.09	0.0387	24	USAGE	0
NUM1	1.43055	0.11788	12.14	<.0001	0	bcdd65	0
NUM2	1.69114	0.05176	32.67	<.0001	0	bhdd55	0
NUM3	44.95474	8.66967	5.19	<.0001	0	MET_DAYS	0

Constant Estimate	-20.9114
Variance Estimate	1938.556
Std Error Estimate	44.02903
AIC	1142.117
SBC	1163.648
Number of Residuals	109

* AIC and SBC do not include log determinant.

Correlations of Parameter Estimates

Variable Parameter	USAGE MU	USAGE MA1,1	USAGE MA1,2	USAGE AR1,1	USAGE AR1,2	bcdd65 NUM1	bhdd55 NUM2	MET_DAYS NUM3
USAGE MU	1.000	-0.009	0.015	-0.030	-0.046	0.026	-0.032	-0.035
USAGE MA1,1	-0.009	1.000	0.296	0.045	0.132	0.003	0.029	0.020
USAGE MA1,2	0.015	0.296	1.000	-0.001	-0.126	0.023	-0.096	0.031
USAGE AR1,1	-0.030	0.045	-0.001	1.000	0.327	0.025	0.159	0.128
USAGE AR1,2	-0.046	0.132	-0.126	0.327	1.000	-0.013	0.013	0.087
bcdd65 NUM1	0.026	0.003	0.023	0.025	-0.013	1.000	0.031	0.082
bhdd55 NUM2	-0.032	0.029	-0.096	0.159	0.013	0.031	1.000	0.080
MET_DAYS NUM3	-0.035	0.020	0.031	0.128	0.087	0.082	0.080	1.000

Autocorrelation Check of Residuals

To Lag	Chi-Square	DF	Pr > ChiSq	-----Autocorrelations-----					
6	0.98	2	0.6117	-0.011	-0.014	-0.020	0.044	0.046	-0.061
12	2.86	8	0.9428	-0.119	-0.031	-0.025	-0.006	0.006	0.003
18	4.19	14	0.9942	0.048	-0.011	-0.064	0.016	0.059	-0.007
24	9.09	20	0.9818	-0.031	-0.001	0.010	-0.176	0.054	-0.018

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Model for variable USAGE

Estimated Intercept -13.0451
Period(s) of Differencing 12

Autoregressive Factors

Factor 1: 1 + 0.36107 B**(12) + 0.24194 B**(24)

Moving Average Factors

Factor 1: 1 + 0.40001 B**(1) + 0.24127 B**(2)

Input Number 1

Input Variable bcdd65
Period(s) of Differencing 12
Overall Regression Factor 1.430548

Input Number 2

Input Variable bhdd55
Period(s) of Differencing 12
Overall Regression Factor 1.691136

Input Number 3

Input Variable MET_DAYS
Period(s) of Differencing 12
Overall Regression Factor 44.95474

Outlier Detection Summary

Maximum number searched 3
Number found 3
Significance used 0.05

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Outlier Details

Obs	Time ID	Type	Estimate	Chi-Square	Approx Prob> ChiSq
62	FEB2011	Additive	-105.38826	14.28	0.0002
97	JAN2014	Additive	101.06618	15.22	<.0001
12	DEC2006	Additive	111.41620	13.03	0.0003

Forecasts for variable USAGE

Obs	Forecast	Std Error	95% Confidence Limits	
122	1895.5990	44.0290	1809.3036	1981.8943
123	1567.5996	47.4210	1474.6563	1660.5430
124	1178.0186	48.5962	1082.7718	1273.2655
125	910.5656	48.5962	815.3187	1005.8125
126	1010.4155	48.5962	915.1686	1105.6624
127	1231.9246	48.5962	1136.6777	1327.1715
128	1296.6687	48.5962	1201.4218	1391.9156
129	1174.9419	48.5962	1079.6950	1270.1887
130	905.7712	48.5962	810.5243	1001.0180
131	1025.2505	48.5962	930.0036	1120.4973
132	1582.3492	48.5962	1487.1024	1677.5961
133	2047.6294	48.5962	1952.3826	2142.8763
134	1905.5970	56.1512	1795.5426	2015.6514
135	1564.1579	57.2677	1451.9153	1676.4005
136	1167.0905	57.6685	1054.0623	1280.1186
137	901.7689	57.6685	788.7407	1014.7971
138	1007.7961	57.6685	894.7679	1120.8243
139	1224.0015	57.6685	1110.9733	1337.0297
140	1279.2390	57.6685	1166.2108	1392.2672
141	1164.4618	57.6685	1051.4336	1277.4900
142	896.3579	57.6685	783.3297	1009.3861
143	1010.5378	57.6685	897.5096	1123.5660
144	1560.9096	57.6685	1447.8814	1673.9377
145	2018.5222	57.6685	1905.4940	2131.5504
146	1886.0380	62.1674	1764.1920	2007.8840
147	1540.0346	62.8575	1416.8363	1663.2330
148	1148.4098	63.1066	1024.7231	1272.0965
149	885.8597	63.1066	762.1731	1009.5464
150	992.8229	63.1066	869.1362	1116.5096
151	1210.8077	63.1066	1087.1210	1334.4944
152	1272.9280	63.1066	1149.2413	1396.6147
153	1152.5421	63.1066	1028.8554	1276.2287
154	883.2179	63.1066	759.5312	1006.9046
155	995.8151	63.1066	872.1284	1119.5017
156	1547.0917	63.1066	1423.4050	1670.7784
157	2000.5666	63.1066	1876.8800	2124.2533

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Conditional Least Squares Estimation

Parameter	Estimate	Standard Error	t Value	Approx Pr > t	Lag	Variable	Shift
MU	-48.10222	9.58865	-5.02	<.0001	0	USAGE	0
MA1,1	0.46667	0.10983	4.25	<.0001	24	USAGE	0
AR1,1	0.47886	0.09694	4.94	<.0001	1	USAGE	0
AR1,2	0.26379	0.09701	2.72	0.0077	2	USAGE	0
AR2,1	-0.47902	0.10158	-4.72	<.0001	12	USAGE	0
NUM1	2.21473	0.16035	13.81	<.0001	0	bcdd65	0
NUM2	1.58910	0.06843	23.22	<.0001	0	bhdd55	0
NUM3	135.09121	11.61453	11.63	<.0001	0	MET_DAYS	0

Constant Estimate -18.309
 Variance Estimate 3476.211
 Std Error Estimate 58.9594
 AIC 1205.773
 SBC 1227.304
 Number of Residuals 109

* AIC and SBC do not include log determinant.

Correlations of Parameter Estimates

Variable Parameter	USAGE MU	USAGE MA1,1	USAGE AR1,1	USAGE AR1,2	USAGE AR2,1	bcdd65 NUM1	bhdd55 NUM2	MET_DAYS NUM3
USAGE MU	1.000	0.154	0.001	-0.066	-0.047	0.034	-0.022	0.003
USAGE MA1,1	0.154	1.000	0.046	0.032	-0.350	0.168	-0.043	0.033
USAGE AR1,1	0.001	0.046	1.000	-0.638	-0.077	-0.038	0.026	-0.014
USAGE AR1,2	-0.066	0.032	-0.638	1.000	-0.031	0.050	0.004	0.024
USAGE AR2,1	-0.047	-0.350	-0.077	-0.031	1.000	0.048	0.135	0.002
bcdd65 NUM1	0.034	0.168	-0.038	0.050	0.048	1.000	0.063	0.160
bhdd55 NUM2	-0.022	-0.043	0.026	0.004	0.135	0.063	1.000	0.137
MET_DAYS NUM3	0.003	0.033	-0.014	0.024	0.002	0.160	0.137	1.000

Autocorrelation Check of Residuals

To Lag	Chi-Square	DF	Pr > ChiSq	-----Autocorrelations-----					
6	4.45	2	0.1080	-0.044	-0.116	0.071	0.078	0.097	-0.054
12	7.47	8	0.4867	-0.038	0.037	-0.047	0.103	0.095	0.006
18	12.57	14	0.5608	0.028	0.057	-0.001	0.069	0.144	-0.096
24	15.97	20	0.7184	0.020	0.060	0.122	-0.042	-0.013	0.062

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Model for variable USAGE

Estimated Intercept -48.1022
Period(s) of Differencing 12

Autoregressive Factors

Factor 1: $1 - 0.47886 B^{(1)} - 0.26379 B^{(2)}$
Factor 2: $1 + 0.47902 B^{(12)}$

Moving Average Factors

Factor 1: $1 - 0.46667 B^{(24)}$

Input Number 1

Input Variable bodd65
Period(s) of Differencing 12
Overall Regression Factor 2.214731

Input Number 2

Input Variable bhdd55
Period(s) of Differencing 12
Overall Regression Factor 1.589096

Input Number 3

Input Variable MET_DAYS
Period(s) of Differencing 12
Overall Regression Factor 135.0912

Outlier Detection Summary

Maximum number searched 3
Number found 3
Significance used 0.05

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Outlier Details

Obs	Time ID	Type	Estimate	Chi-Square	Approx Prob> ChiSq
31	JUL2008	Shift	112.82011	9.74	0.0018
61	JAN2011	Additive	113.29578	7.17	0.0074
97	JAN2014	Additive	127.80672	9.50	0.0021

Forecasts for variable USAGE

Obs	Forecast	Std Error	95% Confidence Limits	
122	3879.6240	58.9594	3764.0656	3995.1823
123	3563.5206	65.3707	3435.3964	3691.6448
124	3274.5761	71.5440	3134.3523	3414.7998
125	3124.8470	74.6673	2978.5019	3271.1922
126	3444.7775	76.7834	3294.2849	3595.2701
127	3758.1635	78.0871	3605.1156	3911.2115
128	3801.1559	78.9333	3646.4495	3955.8623
129	3784.1340	79.4755	3628.3648	3939.9032
130	3307.5207	79.8266	3151.0633	3463.9780
131	3132.0870	80.0538	2975.1845	3288.9895
132	3713.7286	80.2011	3556.5374	3870.9198
133	4187.4876	80.2966	4030.1091	4344.8661
134	3873.5656	87.1490	3702.7567	4044.3745
135	3546.4453	88.8405	3372.3211	3720.5695
136	3251.1923	90.4897	3073.8357	3428.5489
137	3104.3777	91.3886	2925.2593	3283.4962
138	3434.6934	92.0082	3254.3606	3615.0261
139	3713.0985	92.3979	3532.0019	3894.1951
140	3750.9750	92.6531	3569.3783	3932.5717
141	3754.1081	92.8177	3572.1886	3936.0275
142	3259.0654	92.9248	3076.9361	3441.1946
143	3063.4167	92.9942	2881.1514	3245.6821
144	3668.4281	93.0393	3486.0743	3850.7819
145	4138.3960	93.0686	3955.9849	4320.8072
146	3827.6948	94.9116	3641.6714	4013.7182
147	3504.1953	95.3888	3317.2367	3691.1539
148	3207.0703	95.8580	3019.1920	3394.9485
149	3056.0791	96.1169	2867.6934	3244.4647
150	3378.7975	96.2963	3190.0602	3567.5347
151	3671.9701	96.4096	3483.0107	3860.9294
152	3710.6528	96.4839	3521.5477	3899.7578
153	3702.8190	96.5320	3513.6197	3892.0183
154	3215.5423	96.5633	3026.2817	3404.8029
155	3028.7224	96.5836	2839.4220	3218.0228
156	3621.8496	96.5968	3432.5233	3811.1759
157	4093.0779	96.6054	3903.7348	4282.4210

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Conditional Least Squares Estimation

Parameter	Estimate	Standard Error	t Value	Approx Pr > t	Lag	Variable	Shift
MU	-109449.9	133703.4	-0.82	0.4148	0	KWH	0
AR1,1	-0.78168	0.09185	-8.51	<.0001	1	KWH	0
AR1,2	-0.37739	0.11687	-3.23	0.0016	2	KWH	0
AR1,3	-0.27718	0.12060	-2.30	0.0234	3	KWH	0
AR1,4	-0.27741	0.09563	-2.90	0.0045	4	KWH	0
NUM1	19690732	2425300.3	8.12	<.0001	0	ind1	0
NUM2	33687011	2423364.6	13.90	<.0001	0	ind2	0
NUM3	20685229	2214613.1	9.34	<.0001	0	ind3	0
NUM4	13690689	2507989.8	5.46	<.0001	0	ind4	0
NUM5	-84304.4	159339.4	-0.53	0.5978	0	MET_DAYS	0

Constant Estimate -297010
 Variance Estimate 1.553E13
 Std Error Estimate 3941209
 AIC 3994.983
 SBC 4022.858
 Number of Residuals 120

* AIC and SBC do not include log determinant.

Correlations of Parameter Estimates

Variable Parameter		KWH MU	KWH AR1,1	KWH AR1,2	KWH AR1,3	KWH AR1,4
KWH MU		1.000	-0.000	0.002	0.004	0.003
KWH AR1,1		-0.000	1.000	0.593	0.235	0.076
KWH AR1,2		0.002	0.593	1.000	0.608	0.233
KWH AR1,3		0.004	0.235	0.608	1.000	0.602
KWH AR1,4		0.003	0.076	0.233	0.602	1.000
ind1 NUM1		0.000	-0.040	0.058	-0.032	-0.149
ind2 NUM2		0.000	-0.048	0.094	0.022	-0.103
ind3 NUM3		-0.001	-0.023	-0.106	-0.195	-0.165
ind4 NUM4		-0.000	-0.031	0.021	-0.152	0.067
MET_DAYS NUM5		-0.003	0.012	0.077	0.178	0.146

Correlations of Parameter Estimates

Variable Parameter		ind1 NUM1	ind2 NUM2	ind3 NUM3	ind4 NUM4	MET_DAYS NUM5
KWH MU		0.000	0.000	-0.001	-0.000	-0.003
KWH AR1,1		-0.040	-0.048	-0.023	-0.031	0.012
KWH AR1,2		0.058	0.094	-0.106	0.021	0.077

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Correlations of Parameter Estimates

Variable Parameter		ind1 NUM1	ind2 NUM2	ind3 NUM3	ind4 NUM4	MET_DAYS NUM5
KWH	AR1,3	-0.032	0.022	-0.195	-0.152	0.178
KWH	AR1,4	-0.149	-0.103	-0.165	0.067	0.146
ind1	NUM1	1.000	0.039	0.014	-0.003	-0.089
ind2	NUM2	0.039	1.000	0.002	-0.005	0.039
ind3	NUM3	0.014	0.002	1.000	0.016	-0.032
ind4	NUM4	-0.003	-0.005	0.016	1.000	-0.035
MET_DAYS	NUM5	-0.089	0.039	-0.032	-0.035	1.000

Autocorrelation Check of Residuals

To Lag	Chi- Square	DF	Pr > ChiSq	-----Autocorrelations-----					
6	2.01	2	0.3659	-0.020	-0.023	-0.025	-0.061	-0.101	0.021
12	4.67	8	0.7922	-0.015	-0.028	0.021	0.089	-0.100	0.022
18	11.55	14	0.6423	-0.062	-0.109	-0.108	-0.012	0.003	-0.147
24	12.39	20	0.9022	0.045	-0.033	-0.029	-0.008	0.040	-0.008

Autocorrelation Plot of Residuals

Lag	Covariance	Correlation	-1 9 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 9 1																			Std Error
0	1.55331E13	1.00000	*****																			0
1	-3.0447E11	-.01960	.																			0.091287
2	-3.641E11	-.02344	.																			0.091322
3	-3.8293E11	-.02465	.																			0.091372
4	-9.4243E11	-.06067	.																			0.091428
5	-1.5699E12	-.10107	.																			0.091763
6	3.1995E11	0.02060	.																			0.092686
7	-2.2837E11	-.01470	.																			0.092724
8	-4.3157E11	-.02778	.																			0.092743
9	3.24835E11	0.02091	.																			0.092813
10	1.38084E12	0.08890	.																			0.092852
11	-1.5589E12	-.10036	.																			0.093558
12	3.4769E11	0.02238	.																			0.094451
13	-9.6823E11	-.06233	.																			0.094495
14	-1.6859E12	-.10854	.																			0.094837
15	-1.6734E12	-.10773	.																			0.095867
16	-1.8093E11	-.01165	.																			0.096871
17	4.56594E10	0.00294	.																			0.096882
18	-2.277E12	-.14659	.																			0.096883
19	6.95593E11	0.04478	.																			0.098714
20	-5.0551E11	-.03254	.																			0.098883

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Autocorrelation Plot of Residuals

Lag	Covariance	Correlation	-1 9 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 9 1	Std Error
21	-4.4722E11	-.02879	| . * | .	0.098972
22	-1.2047E11	-.00776	| . | .	0.099042
23	6.28785E11	0.04048	| . * | .	0.099047
24	-1.1895E11	-.00766	| . | .	0.099185

"," marks two standard errors

Inverse Autocorrelations

Lag	Correlation	-1 9 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 9 1
1	0.16680	| . | ***.
2	0.20301	| . | ****
3	0.18887	| . | ****
4	0.21469	| . | ****
5	0.18821	| . | ****
6	0.10810	| . | **.
7	0.16141	| . | ***.
8	0.10825	| . | **.
9	0.10669	| . | **.
10	0.04222	| . | *.
11	0.18397	| . | ****
12	0.05819	| . | *.
13	0.15930	| . | ***.
14	0.16633	| . | ***.
15	0.17171	| . | ***.
16	0.11230	| . | **.
17	0.08110	. **.
18	0.20303	. ****
19	0.05171	. *.
20	0.09659	. **.
21	0.06119	. *.
22	0.07192	. *.
23	0.00872	. .
24	0.02330	. .

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Partial Autocorrelations

Lag	Correlation	-1	9	8	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	8	9	1	
1	-0.01960																						
2	-0.02383											.											.
3	-0.02561											.	*										.
4	-0.06235											.	*										.
5	-0.10549											.	**										.
6	0.01182											.											.
7	-0.02294											.											.
8	-0.03807											.	*										.
9	0.00615											.											.
10	0.07950											.		**									.
11	-0.09843											.	**										.
12	0.01529											.											.
13	-0.06785											.	*										.
14	-0.10615											.	**										.
15	-0.11899											.	**										.
16	-0.05274											.	*										.
17	-0.01471											.											.
18	-0.19698											.	****										.
19	-0.01763											.											.
20	-0.08834											.	**										.
21	-0.05812											.	*										.
22	-0.08187											.	**										.
23	-0.00703											.											.
24	-0.02845											.	*										.

Model for variable KWH

Estimated Intercept -109450
 Period(s) of Differencing 1

Autoregressive Factors

Factor 1: 1 + 0.78168 B**(1) + 0.37739 B**(2) + 0.27718 B**(3) + 0.27741 B**(4)

Input Number 1

Input Variable ind1
 Period(s) of Differencing 1
 Overall Regression Factor 19690732

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Input Number 2

Input Variable ind2
 Period(s) of Differencing 1
 Overall Regression Factor 33687011

Input Number 3

Input Variable ind3
 Period(s) of Differencing 1
 Overall Regression Factor 20685229

Input Number 4

Input Variable ind4
 Period(s) of Differencing 1
 Overall Regression Factor 13690689

Input Number 5

Input Variable MET_DAYS
 Period(s) of Differencing 1
 Overall Regression Factor -84304.4

Outlier Detection Summary

Maximum number searched 3
 Number found 3
 Significance used 0.05

Outlier Details

Obs	Time ID	Type	Estimate	Chi-Square	Approx Prob> ChiSq
56	AUG2010	Additive	12094229	17.12	<.0001
54	JUN2010	Additive	11448211	16.40	<.0001
3	MAR2006	Shift	-8788483.0	12.41	0.0004

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Forecasts for variable KWH

Obs	Forecast	Std Error	95% Confidence Limits	
122	21080980.7	3941209	13356353.2	28805608.1
123	20588695.1	4034040	12682121.6	28495268.7
124	20454712.7	4409794	11811675.1	29097750.3
125	20627983.0	4552699	11704857.7	29551108.3
126	20257874.4	4672775	11099403.2	29416345.5
127	20302931.8	5066793	10372199.3	30233664.3
128	20096876.6	5208085	9889218.5	30304534.8
129	20099773.7	5464535	9389481.9	30810065.6
130	20032482.2	5630826	8996265.8	31068698.6
131	19870870.0	5796909	8509136.7	31232603.2
132	19707144.9	6002855	7941764.8	31472525.1
133	19562490.0	6156603	7495770.0	31629210.1
134	19573481.1	6342769	7141883.0	32005079.1
135	19410995.9	6499457	6672294.4	32149697.3
136	19256652.3	6658204	6206813.2	32306491.4
137	19178236.1	6819415	5812428.4	32544043.9
138	19023763.2	6967161	5368377.5	32679148.8
139	18909399.3	7121625	4951271.5	32867527.1
140	18821991.5	7265744	4581395.4	33062587.6
141	18802360.7	7409877	4279269.6	33325451.9
142	18692269.7	7551588	3891429.1	33493110.3
143	18583954.3	7688740	3514300.0	33653608.6
144	18368050.1	7825939	3029490.9	33706609.4
145	18262181.4	7958784	2663251.3	33861111.5
146	18259646.5	8090510	2402538.3	34116754.8
147	18092774.2	8219893	1982079.5	34203469.0
148	17950689.2	8346949	1590969.2	34310409.2
149	17857335.6	8472670	1251207.8	34463463.5
150	17714880.9	8596015	867001.2	34562760.6
151	17594579.2	8717966	507679.7	34681478.6
152	17508016.9	8838094	185671.0	34830362.8
153	17490778.8	8956584	-63802.7	35045360.2
154	17376810.2	9073647	-407210.2	35160830.6
155	17272035.7	9189080	-738230.9	35282302.3
156	17053929.3	9303188	-1179985.1	35287843.6
157	16948856.7	9415857	-1505884.7	35403598.1

Kentucky Power Company
 Industrial Mine Power

The ARIMA Procedure

Conditional Least Squares Estimation

Parameter	Estimate	Standard Error	t Value	Approx Pr > |t|	Lag	Variable	Shift
MU	-2692779.1	1150580.0	-2.34	0.0213	0	KWH	0
MA1,1	0.33249	0.11436	2.91	0.0045	1	KWH	0
MA2,1	0.60859	0.08545	7.12	<.0001	12	KWH	0
AR1,1	0.93034	0.04538	20.50	<.0001	1	KWH	0
NUM1	-9640066.1	2653139.8	-3.63	0.0004	0	min1	0
NUM2	-6197144.3	2679327.8	-2.31	0.0228	0	min2	0
NUM3	-4563805.4	3128238.1	-1.46	0.1477	0	min3	0
NUM4	-12424865	3450135.6	-3.60	0.0005	0	min4	0
NUM5	593170.4	363444.1	1.63	0.1058	0	MET_DAYS	0

Constant Estimate -187566
 Variance Estimate 9.406E12
 Std Error Estimate 3066909
 AIC 3574.023
 SBC 3598.245
 Number of Residuals 109

* AIC and SBC do not include log determinant.

Correlations of Parameter Estimates

Variable		KWH	KWH	KWH	KWH	min1
Parameter		MU	MA1,1	MA2,1	AR1,1	NUM1
KWH	MU	1.000	0.094	0.041	0.138	-0.243
KWH	MA1,1	0.094	1.000	0.004	0.510	-0.173
KWH	MA2,1	0.041	0.004	1.000	0.137	-0.026
KWH	AR1,1	0.138	0.510	0.137	1.000	-0.254
min1	NUM1	-0.243	-0.173	-0.026	-0.254	1.000
min2	NUM2	-0.217	-0.214	0.091	0.022	0.044
min3	NUM3	-0.093	-0.008	-0.093	0.040	0.009
min4	NUM4	-0.142	0.015	-0.115	0.084	0.006
MET_DAYS	NUM5	-0.025	-0.057	0.094	-0.033	0.029

Correlations of Parameter Estimates

Variable		min2	min3	min4	MET_DAYS
Parameter		NUM2	NUM3	NUM4	NUM5
KWH	MU	-0.217	-0.093	-0.142	-0.025
KWH	MA1,1	-0.214	-0.008	0.015	-0.057
KWH	MA2,1	0.091	-0.093	-0.115	0.094
KWH	AR1,1	0.022	0.040	0.084	-0.033
min1	NUM1	0.044	0.009	0.006	0.029

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Autocorrelation Plot of Residuals

Lag	Covariance	Correlation	-1 9 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 9 1	Std Error
24	4.33748E11	0.04611	| . |* . |	0.104081

"." marks two standard errors

Inverse Autocorrelations

Lag	Correlation	-1 9 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 9 1
1	-0.05453	| . * | . |
2	0.07621	| . ** | . |
3	0.03484	| . * | . |
4	0.08526	| . ** | . |
5	-0.11355	| . ** | . |
6	0.04508	| . * | . |
7	-0.03289	| . * | . |
8	-0.07609	| . ** | . |
9	0.07640	| . ** | . |
10	0.03247	| . * | . |
11	-0.11749	| . ** | . |
12	0.01332	| . | . |
13	0.00373	| . | . |
14	-0.15435	| . *** | . |
15	-0.04150	| . * | . |
16	-0.04533	| . * | . |
17	-0.00285	| . | . |
18	-0.01526	| . | . |
19	0.12581	| . *** | . |
20	-0.06912	| . * | . |
21	-0.01281	| . | . |
22	0.05964	| . * | . |
23	0.01451	| . | . |
24	-0.05883	| . * | . |

Partial Autocorrelations

Lag	Correlation	-1 9 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 9 1
1	0.03600	. * .
2	-0.09717	. ** .
3	-0.00799	. .
4	-0.09617	. ** .
5	0.06758	. * .
6	-0.01667	. .
7	0.05275	. * .

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Partial Autocorrelations

Lag	Correlation	-1	9	8	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	8	9	1	
8	0.04654												.	*	.								
9	-0.06541											.	*	.									
10	0.00729											.	.	.									
11	0.07917											.	**	.									
12	-0.06040										.	*	.	.									
13	0.03387										.	.	*	.									
14	0.13458										.	.	***	.									
15	0.06815										.	.	*	.									
16	0.05467										.	.	*	.									
17	0.01710										.	.	.	.					
18	-0.00067										.	.	.	.					
19	-0.11964										.	.	**	.									
20	0.08126										.	.	.	**	.								
21	0.00712										.	.	.	.					
22	-0.07990										.	.	**	.									
23	-0.01032										.	.	.	.					
24	0.06554										.	.	.	*	.								

Model for variable KWH

Estimated Intercept -2692779
 Period(s) of Differencing 12

Autoregressive Factors

Factor 1: 1 - 0.93034 B**(1)

Moving Average Factors

Factor 1: 1 - 0.33249 B**(1)
 Factor 2: 1 - 0.60859 B**(12)

Input Number 1

Input Variable min1
 Period(s) of Differencing 12
 Overall Regression Factor -9640066

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The ARIMA Procedure

Input Number 2

Input Variable min2
 Period(s) of Differencing 12
 Overall Regression Factor -6197144

Input Number 3

Input Variable min3
 Period(s) of Differencing 12
 Overall Regression Factor -4563805

Input Number 4

Input Variable min4
 Period(s) of Differencing 12
 Overall Regression Factor -1.242E7

Input Number 5

Input Variable MET_DAYS
 Period(s) of Differencing 12
 Overall Regression Factor 593170.4

Outlier Detection Summary

Maximum number searched 3
 Number found 3
 Significance used 0.05

Outlier Details

Obs	Time ID	Type	Estimate	Chi-Square	Approx Prob> ChiSq
53	MAY2010	Additive	10452193	27.52	<.0001
25	JAN2008	Shift	5733957.5	7.01	0.0081
79	JUL2012	Shift	-5482990.3	7.42	0.0064

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The ARIMA Procedure

Forecasts for variable KWH

Obs	Forecast	Std Error	95% Confidence Limits	
122	43999529.0	3066909	37988498.3	50010559.8
123	42494152.2	3573220	35490769.9	49497534.5
124	40084660.6	3959523	32324137.1	47845184.0
125	36207590.3	4265734	27846905.0	44568275.7
126	34916018.4	4514033	26068676.2	43763360.6
127	30092624.8	4718409	20844713.7	39340535.9
128	32044285.3	4888411	22463176.4	41625394.2
129	32928629.9	5030919	23068210.4	42789049.3
130	31159711.9	5151083	21063774.3	41255649.5
131	35962894.9	5252872	25667455.4	46258334.4
132	41603446.2	5339408	31138399.6	52068492.8
133	42850081.8	5413191	32240422.0	53459741.6
134	41720250.7	5780985	30389728.0	53050773.5
135	40186071.5	5969571	28485928.3	51886214.7
136	37749783.6	6128115	25738898.4	49760668.9
137	33847783.7	6262102	21574288.4	46121278.9
138	32533018.5	6375801	20036678.1	45029358.9
139	27688047.2	6472600	15001985.0	40374109.3
140	29619633.0	6555229	16771620.5	42467645.5
141	30485301.1	6625916	17498744.3	43471858.0
142	28699007.6	6686495	15593717.3	41804298.0
143	33486025.5	6738490	20278828.1	46693222.8
144	39111537.6	6783171	25816766.1	52406309.0
145	40344181.5	6821609	26974074.1	53714288.9
146	39201333.4	7074118	25336317.2	53066349.5
147	37655043.7	7200580	23542167.0	51767920.5
148	35207489.1	7308271	20883541.0	49531437.2
149	31295007.1	7400217	16790847.6	45799166.6
150	29970490.0	7478888	15312138.7	44628841.4
151	25116446.0	7546319	10325933.0	39906959.1
152	27039591.2	7604200	12135632.8	41943549.5
153	27897406.6	7653945	12895949.3	42898864.0
154	26103807.4	7696742	11018469.3	41189145.5
155	30884028.4	7733594	15726462.8	46041593.9
156	36503217.0	7765349	21283412.3	51723021.7
157	37729978.0	7792730	22456507.4	53003448.5

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The ARIMA Procedure

Conditional Least Squares Estimation

Parameter	Estimate	Standard Error	t Value	Approx Pr > t	Lag	Variable	Shift
MU	-194.61379	74.15036	-2.62	0.0102	0	KWH	0
MA1,1	0.43005	0.07039	6.11	<.0001	1	KWH	0
MA1,2	0.83304	0.09912	8.40	<.0001	4	KWH	0
MA2,1	0.31970	0.13512	2.37	0.0201	2	KWH	0
AR1,1	-0.75160	0.12097	-6.21	<.0001	2	KWH	0
AR2,1	-0.33226	0.10735	-3.10	0.0026	7	KWH	0
AR3,1	-0.35424	0.10786	-3.28	0.0015	9	KWH	0
AR4,1	-0.74499	0.07458	-9.99	<.0001	12	KWH	0
NUM1	377893.1	8500.1	44.46	<.0001	0	or1	0
NUM2	125382.4	11307.1	11.09	<.0001	0	or2	0
NUM3	134603.9	7126.5	18.89	<.0001	0	or3	0
NUM4	174748.4	7566.5	23.10	<.0001	0	or4	0
NUM5	140281.5	14907.0	9.41	<.0001	0	or5	0
NUM6	256159.7	25666.9	9.98	<.0001	0	or6	0
NUM7	229533.7	24647.1	9.31	<.0001	0	or7	0
NUM8	53752.7	6692.0	8.03	<.0001	0	or8	0
NUM9	-391029.4	16689.0	-23.43	<.0001	0	or9	0
NUM10	-3312.4	2833.4	-1.17	0.2455	0	MET_DAYS	0

Constant Estimate -1073.21
 Variance Estimate 8.7114E8
 Std Error Estimate 29515.08
 AIC 2546.014
 SBC 2594.292
 Number of Residuals 108

* AIC and SBC do not include log determinant.

Correlations of Parameter Estimates

Variable Parameter	KWH MU	KWH MA1,1	KWH MA1,2	KWH MA2,1	KWH AR1,1	KWH AR2,1
KWH MU	1.000	-0.396	-0.531	0.218	0.194	0.132
KWH MA1,1	-0.396	1.000	-0.486	0.273	0.538	0.113
KWH MA1,2	-0.531	-0.486	1.000	-0.410	-0.684	-0.222
KWH MA2,1	0.218	0.273	-0.410	1.000	0.629	0.084
KWH AR1,1	0.194	0.538	-0.684	0.629	1.000	0.167
KWH AR2,1	0.132	0.113	-0.222	0.084	0.167	1.000
KWH AR3,1	-0.217	0.148	0.095	-0.025	-0.023	0.009
KWH AR4,1	-0.076	-0.040	0.128	0.117	0.039	0.050
or1 NUM1	0.038	0.088	-0.016	0.041	0.084	0.061
or2 NUM2	0.082	-0.222	0.156	-0.050	-0.164	-0.096
or3 NUM3	-0.144	-0.030	0.056	-0.094	-0.060	-0.003

Kentucky Power Company
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The ARIMA Procedure

Correlations of Parameter Estimates

Variable Parameter		KWH MU	KWH MA1,1	KWH MA1,2	KWH MA2,1	KWH AR1,1	KWH AR2,1
or4	NUM4	0.112	0.150	-0.146	0.010	0.095	-0.071
or5	NUM5	0.151	0.040	0.048	0.055	-0.051	0.129
or6	NUM6	-0.180	-0.113	0.063	-0.171	-0.149	0.010
or7	NUM7	-0.012	0.266	-0.188	0.096	0.204	0.113
or8	NUM8	0.053	-0.001	-0.053	0.088	0.057	-0.081
or9	NUM9	-0.001	-0.100	0.163	0.031	-0.083	0.170
MET_DAYS	NUM10	-0.278	-0.153	0.056	-0.171	-0.095	-0.086

Correlations of Parameter Estimates

Variable Parameter		KWH AR3,1	KWH AR4,1	or1 NUM1	or2 NUM2	or3 NUM3	or4 NUM4
KWH	MU	-0.217	-0.076	0.038	0.082	-0.144	0.112
KWH	MA1,1	0.148	-0.040	0.088	-0.222	-0.030	0.150
KWH	MA1,2	0.095	0.128	-0.016	0.156	0.056	-0.146
KWH	MA2,1	-0.025	0.117	0.041	-0.050	-0.094	0.010
KWH	AR1,1	-0.023	0.039	0.084	-0.164	-0.060	0.095
KWH	AR2,1	0.009	0.050	0.061	-0.096	-0.003	-0.071
KWH	AR3,1	1.000	0.020	-0.033	-0.082	0.193	-0.001
KWH	AR4,1	0.020	1.000	0.018	-0.001	-0.069	-0.073
or1	NUM1	-0.033	0.018	1.000	-0.136	-0.218	0.041
or2	NUM2	-0.082	-0.001	-0.136	1.000	-0.166	-0.272
or3	NUM3	0.193	-0.069	-0.218	-0.166	1.000	0.166
or4	NUM4	-0.001	-0.073	0.041	-0.272	0.166	1.000
or5	NUM5	0.047	0.082	0.205	-0.191	-0.226	0.003
or6	NUM6	-0.063	0.025	-0.145	0.080	-0.021	-0.414
or7	NUM7	0.076	-0.008	0.241	-0.810	-0.010	0.358
or8	NUM8	-0.035	-0.043	-0.042	-0.044	0.123	0.343
or9	NUM9	0.222	0.039	0.047	-0.031	0.004	0.001
MET_DAYS	NUM10	-0.046	-0.026	-0.316	0.267	0.266	-0.365

Correlations of Parameter Estimates

Variable Parameter		or5 NUM5	or6 NUM6	or7 NUM7	or8 NUM8	or9 NUM9	MET_DAYS NUM10
KWH	MU	0.151	-0.180	-0.012	0.053	-0.001	-0.278
KWH	MA1,1	0.040	-0.113	0.266	-0.001	-0.100	-0.153
KWH	MA1,2	0.048	0.063	-0.188	-0.053	0.163	0.056
KWH	MA2,1	0.055	-0.171	0.096	0.088	0.031	-0.171
KWH	AR1,1	-0.051	-0.149	0.204	0.057	-0.083	-0.095
KWH	AR2,1	0.129	0.010	0.113	-0.081	0.170	-0.086
KWH	AR3,1	0.047	-0.063	0.076	-0.035	0.222	-0.046
KWH	AR4,1	0.082	0.025	-0.008	-0.043	0.039	-0.026

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The ARIMA Procedure

Autocorrelation Plot of Residuals

Lag	Covariance	Correlation	-1 9 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 9 1	Std Error
18	35984962	0.04131	. | * .	0.108924
19	-66713824	-.07658	. ** | .	0.109069
20	6468629	0.00743	. | .	0.109566
21	-145219605	-.16670	. *** | .	0.109570
22	30136047	0.03459	. | * .	0.111894
23	-56841849	-.06525	. * | .	0.111993
24	-81895817	-.09401	. ** | .	0.112344

"." marks two standard errors

Inverse Autocorrelations

Lag	Correlation	-1 9 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 9 1
1	-0.10437	. ** | .
2	0.04563	. | * .
3	0.06406	. | * .
4	-0.11384	. ** | .
5	-0.02611	. * | .
6	-0.00335	. | .
7	-0.09084	. ** | .
8	-0.05883	. * | .
9	0.03908	. | * .
10	-0.09322	. ** | .
11	0.10246	. | ** .
12	0.08705	. | ** .
13	0.17775	. | **** .
14	-0.10535	. ** | .
15	0.04984	. | * .
16	-0.02345	. | .
17	-0.15197	. *** .
18	0.02416	. .
19	0.02396	. .
20	-0.06942	. * .
21	0.12940	. *** .
22	-0.04648	. * .
23	0.00430	. .
24	0.16610	. *** .

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Partial Autocorrelations

Lag	Correlation	-1	9	8	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	8	9	1	
1	0.07565												.	**	.								
2	-0.02648												.	*	.								
3	-0.06164												.	*	.								
4	0.04770												.	*	.								
5	-0.07387												.	*	.								
6	0.04224												.	*	.								
7	0.03519												.	*	.								
8	0.11193												.	**	.								
9	-0.00000												.	.	.								
10	0.16209												.	***	.								
11	-0.11793												.	**	.								
12	-0.07423												.	*	.								
13	-0.17241												.	***	.								
14	0.04646												.	*	.								
15	-0.07072												.	*	.								
16	0.03772												.	*	.								
17	0.13293												.	***	.								
18	-0.02428												.	.	.								
19	-0.01130												.	.	.								
20	0.02085												.	.	.								
21	-0.12552												.	***	.								
22	0.07233												.	*	.								
23	-0.04564												.	*	.								
24	-0.20150												.	***	.								

Model for variable KWH

Estimated Intercept -194.614
 Period(s) of Differencing 1,12

Autoregressive Factors

Factor 1: 1 + 0.7516 B**(2)
 Factor 2: 1 + 0.33226 B**(7)
 Factor 3: 1 + 0.35424 B**(9)
 Factor 4: 1 + 0.74499 B**(12)

Moving Average Factors

Factor 1: 1 - 0.43005 B**(1) - 0.83304 B**(4)
 Factor 2: 1 - 0.3197 B**(2)

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The ARIMA Procedure

Input Number 1

Input Variable	or1
Period(s) of Differencing	1,12
Overall Regression Factor	377893.1

Input Number 2

Input Variable	or2
Period(s) of Differencing	1,12
Overall Regression Factor	125382.4

Input Number 3

Input Variable	or3
Period(s) of Differencing	1,12
Overall Regression Factor	134603.9

Input Number 4

Input Variable	or4
Period(s) of Differencing	1,12
Overall Regression Factor	174748.4

Input Number 5

Input Variable	or5
Period(s) of Differencing	1,12
Overall Regression Factor	140281.5

Input Number 6

Input Variable	or6
Period(s) of Differencing	1,12
Overall Regression Factor	256159.7

Input Number 7

Input Variable	or7
Period(s) of Differencing	1,12
Overall Regression Factor	229533.7

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The ARIMA Procedure

Input Number 8

Input Variable or8
 Period(s) of Differencing 1,12
 Overall Regression Factor 53752.71

Input Number 9

Input Variable or9
 Period(s) of Differencing 1,12
 Overall Regression Factor -391029

Input Number 10

Input Variable MET_DAYS
 Period(s) of Differencing 1,12
 Overall Regression Factor -3312.39

Forecasts for variable KWH

Obs	Forecast	Std Error	95% Confidence Limits	
122	937153.4	29515.08	879304.9	995001.9
123	918960.6	33972.43	852375.8	985545.3
124	786506.9	37055.18	713880.0	859133.7
125	706961.9	37074.59	634297.1	779626.8
126	637252.4	37129.65	564479.6	710025.1
127	664119.1	39095.60	587493.2	740745.1
128	749983.5	39276.30	673003.4	826963.7
129	814957.3	39715.28	737116.8	892797.8
130	947795.8	40521.60	868374.9	1027216.7
131	1002535.1	42796.10	918656.3	1086413.9
132	1109437.2	43731.92	1023724.2	1195150.2
133	1106111.6	44259.68	1019364.2	1192858.9
134	926306.7	45230.42	837656.7	1014956.7
135	911874.1	45231.39	823222.2	1000526.0
136	786690.8	45237.36	698027.2	875354.4
137	694679.4	45330.01	605834.2	783524.6
138	629178.1	45330.31	540332.3	718023.9
139	659726.8	45501.34	570545.8	748907.8
140	741482.6	45502.00	652300.4	830664.9
141	814886.9	45505.14	725698.4	904075.3
142	944270.4	45875.16	854356.7	1034184.1
143	995386.3	46511.94	904224.6	1086548.0
144	1093270.8	46738.18	1001665.6	1184875.9
145	1092713.4	46750.46	1001084.2	1184342.6
146	917571.6	51453.66	816724.3	1018419.0

Kentucky Power Company
Other Retail

The ARIMA Procedure

Forecasts for variable KWH

Obs	Forecast	Std Error	95% Confidence Limits	
147	900458.2	52446.78	797664.4	1003252.0
148	769279.0	54092.61	663259.4	875298.6
149	685686.0	54162.45	579529.5	791842.4
150	616834.9	54288.91	510430.6	723239.2
151	644341.6	55367.14	535824.0	752859.2
152	728818.2	55492.80	620054.3	837582.1
153	795594.9	55807.85	686213.6	904976.3
154	927244.2	56482.64	816540.3	1037948.1
155	980605.1	58098.64	866733.8	1094476.3
156	1084742.0	58840.86	969416.0	1200067.9
157	1081898.2	58929.81	966397.9	1197398.6