

Table 1
Marginal Costs of Energy from PMDAM (1995\$; m/kwh)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
Hour of Day:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	Month: October																								
2	Day: Sunday																								
3	1996	14.99	14.74	14.53	14.45	14.59	14.94	15.2	15.48	15.67	15.83	15.83	15.82	15.64	15.63	15.58	15.59	15.66	15.75	15.88	15.89	15.82	15.59	15.31	14.26
4	1997	15.93	15.64	15.5	15.41	15.44	15.84	16.3	16.7	16.88	16.99	17.02	16.97	16.85	16.81	16.76	16.76	16.82	16.96	17.03	17.1	16.99	16.8	16.38	15.04
5	1998	15.29	15.09	14.99	14.89	14.99	15.2	15.47	15.75	15.93	16.04	16.06	16.04	15.9	15.87	15.86	15.84	15.88	15.95	16.12	16.1	16	15.89	15.56	14.67
6	1999	14.36	14.12	14.01	13.97	14.01	14.29	14.59	14.86	15.02	15.13	15.14	15.12	15.04	14.99	14.95	14.92	15.01	15.1	15.24	15.24	15.18	14.99	14.65	13.91
7	2000	13.19	13.07	12.97	12.98	12.98	13.14	13.42	13.69	13.87	14	13.96	13.96	13.83	13.84	13.75	13.77	13.83	13.93	14.06	14.07	14.01	13.8	13.43	12.96
8	Levelized:	14.1	13.9	13.8	13.7	13.8	14.1	14.4	14.6	14.8	14.9	14.9	14.9	14.8	14.8	14.7	14.7	14.8	14.9	15.0	15.0	14.9	14.8	14.4	13.6
9	Month: October																								
10	Day: Weekday																								
11	1996	14.8	14.53	14.36	14.36	14.78	15.33	15.86	16.18	16.17	16.18	16.15	16.09	15.96	15.95	15.92	15.87	15.89	15.96	16.08	16.06	15.89	15.68	15.37	14.66
12	1997	15.9	15.64	15.56	15.54	15.84	16.49	17.08	17.37	17.38	17.39	17.37	17.28	17.18	17.15	17.14	17.11	17.1	17.19	17.29	17.29	17.11	16.91	16.55	15.7
13	1998	15.18	15	14.88	14.92	15.08	15.64	16.11	16.37	16.41	16.38	16.33	16.32	16.2	16.15	16.15	16.13	16.12	16.19	16.32	16.3	16.14	15.92	15.64	14.95
14	1999	14.24	14.04	13.96	13.95	14.18	14.69	15.2	15.46	15.55	15.54	15.53	15.47	15.35	15.35	15.32	15.26	15.25	15.31	15.47	15.46	15.45	15.31	15.07	14.76
15	2000	13.12	12.99	12.92	12.96	13.14	13.57	14.06	14.35	14.39	14.41	14.38	14.29	14.19	14.18	14.18	14.11	14.13	14.2	14.3	14.31	14.18	13.93	13.62	13.09
16	Levelized:	14.0	13.8	13.7	13.7	14.0	14.5	15.0	15.3	15.3	15.3	15.3	15.2	15.1	15.1	15.1	15.0	15.0	15.1	15.2	15.2	15.1	14.8	14.5	13.9
17	Month: October																								
18	Day: Saturday																								
19	1996	15.12	14.85	14.76	14.6	14.71	15.04	15.25	15.55	15.8	15.93	15.93	15.84	15.73	15.65	15.58	15.55	15.64	15.68	15.81	15.8	15.68	15.5	15.28	14.45
20	1997	16.14	15.8	15.71	15.61	15.66	16.01	16.38	16.75	17	17.12	17.12	17.05	16.93	16.87	16.82	16.76	16.83	16.9	17.03	16.98	16.91	16.7	16.39	15.39
21	1998	15.42	15.24	15.16	15.09	15.15	15.28	15.54	15.82	16.05	16.13	16.16	16.12	15.98	15.92	15.85	15.86	15.88	15.96	16.06	16.03	15.96	15.82	15.59	14.84
22	1999	14.49	14.29	14.17	14.05	14.11	14.38	14.65	14.91	15.19	15.29	15.32	15.24	15.13	15.05	15.01	14.96	15	15.07	15.21	15.22	15.11	14.93	14.66	14.11
23	2000	13.37	13.2	13.14	13.05	13.05	13.28	13.5	13.75	13.99	14.14	14.12	14.08	13.97	13.9	13.87	13.77	13.87	13.92	14.08	14.03	13.93	13.77	13.51	13.08
24	Levelized:	14.3	14.1	14.0	13.9	13.9	14.2	14.4	14.7	14.9	15.1	15.1	15.0	14.9	14.8	14.8	14.7	14.8	14.8	15.0	15.0	14.9	14.7	14.4	13.8
25	Month: November																								
26	Day: Sunday																								
27	1996	15.18	15.06	15.01	14.99	15.01	15.13	15.31	15.63	15.87	15.97	15.97	15.92	15.78	15.7	15.65	15.67	15.89	16.17	16.11	16.06	15.94	15.7	15.4	14.86
28	1997	16.19	16.06	15.91	15.89	15.94	16.2	16.48	16.73	16.93	17.05	17.02	17.01	16.85	16.79	16.76	16.81	16.99	17.2	17.15	17.07	17	16.8	16.5	15.81
29	1998	15.44	15.32	15.25	15.26	15.31	15.43	15.56	15.84	16.1	16.18	16.2	16.19	16	15.95	15.9	15.9	16.15	16.34	16.28	16.24	16.12	15.93	15.67	15.09
30	1999	14.48	14.36	14.25	14.25	14.27	14.42	14.68	15	15.19	15.34	15.28	15.27	15.09	15.03	14.99	14.98	15.22	15.47	15.43	15.32	15.21	15.03	14.72	14.18
31	2000	13.48	13.35	13.23	13.2	13.25	13.44	13.62	13.95	14.13	14.28	14.29	14.27	14.08	14.02	13.99	14.01	14.22	14.44	14.42	14.33	14.23	14.05	13.7	13.23
32	Levelized:	14.3	14.2	14.1	14.1	14.1	14.3	14.5	14.8	15.0	15.1	15.1	15.1	14.9	14.8	14.8	14.8	15.0	15.2	15.2	15.1	15.0	14.8	14.6	14.0
33	Month: November																								
34	Day: Weekday																								
35	1996	15.1	14.99	14.97	14.96	15.08	15.47	16.02	16.38	16.39	16.37	16.34	16.2	16.04	15.99	15.98	15.96	16.19	16.48	16.42	16.26	16.05	15.82	15.53	14.98
36	1997	16.1	15.99	15.92	15.94	16.12	16.57	17.13	17.43	17.45	17.35	17.32	17.25	17.12	17.11	17.04	17.03	17.27	17.53	17.45	17.32	17.17	16.92	16.64	16.02
37	1998	15.36	15.3	15.17	15.25	15.38	15.69	16.21	16.48	16.54	16.48	16.44	16.37	16.23	16.19	16.17	16.14	16.35	16.58	16.52	16.4	16.28	16.04	15.76	15.21
38	1999	14.39	14.27	14.24	14.24	14.4	14.79	15.32	15.63	15.69	15.64	15.59	15.46	15.39	15.36	15.3	15.28	15.47	15.76	15.7	15.55	15.42	15.15	14.84	14.32
39	2000	13.36	13.22	13.18	13.21	13.34	13.77	14.29	14.59	14.63	14.6	14.57	14.47	14.34	14.34	14.27	14.3	14.5	14.72	14.65	14.54	14.38	14.16	13.83	13.34
40	Levelized:	14.2	14.1	14.1	14.1	14.2	14.6	15.1	15.4	15.5	15.4	15.4	15.3	15.2	15.1	15.1	15.1	15.3	15.5	15.5	15.3	15.2	15.0	14.7	14.1
41	Month: November																								
42	Day: Saturday																								
43	1996	15.22	15.12	15.08	15.02	15.07	15.24	15.4	15.75	16	16.12	16.11	16.04	15.84	15.73	15.7	15.69	15.95	16.2	16.08	15.97	15.84	15.66	15.46	14.92
44	1997	16.2	15.98	15.89	15.85	15.94	16.2	16.46	16.85	17.04	17.13	17.17	17.03	16.87	16.8	16.76	16.79	17.02	17.21	17.12	17.03	16.92	16.71	16.48	15.68
45	1998	15.52	15.4	15.37	15.32	15.41	15.49	15.67	16	16.21	16.3	16.31	16.23	16.11	16.02	15.97	15.94	16.19	16.36	16.28	16.21	16.09	15.92	15.72	15.21
46	1999	14.49	14.4	14.33	14.28	14.35	14.5	14.71	15.09	15.32	15.39	15.41	15.31	15.18	15.09	15.01	15.06	15.29	15.48	15.42	15.29	15.18	15.06	14.73	14.22
47	2000	13.49	13.36	13.27	13.25	13.27	13.49	13.72	14.03	14.3	14.4	14.4	14.34	14.14	14.05	14	14.03	14.25	14.46	14.36	14.27	14.17	14.01	13.71	13.21
48	Levelized:	14.3	14.2	14.2	14.1	14.2	14.3	14.5	14.9	15.1	15.2	15.2	15.1	15.0	14.9	14.8	14.8	15.1	15.3	15.2	15.1	15.0	14.8	14.6	14.0
49	Month: December																								
50	Day: Sunday																								
51	1996	14.74	14.62	14.63	14.6	14.61	14.7	14.8	15.08	15.32	15.38	15.37	15.34	15.18	15.11	15.07	15.1	15.35	15.51	15.49	15.37	15.34	15.15	14.95	14.5
52	1997	16.24	16.14	16.03	16.05	16.07	16.19	16.34	16.57	16.82	16.94	16.9	16.84	16.7	16.6	16.56	16.62	16.84	17.01	16.95	16.88	16.8	16.67	16.42	15.98
53	1998	15.65	15.51	15.44	15.46	15.47	15.59	15.74	15.98	16.25	16.34	16.28	16.23	16.08	16.01	15.97	15.94	16.23	16.44	16.37	16.31	16.19	16.04	15.82	15.41
54	1999	14.76	14.62	14.55	14.54	14.59	14.7	14.86	15.11	15.37	15.46	15.46	15.4	15.22	15.19	15.08	15.1	15.4	15.58	15.52	15.44	15.32	15.2	14.97	14.47
55	2000	13.41	13.31	13.27	13.25	13.3	13.39	13.52	13.82	14.08	14.19	14.2	14.13	13.93	13.81										

Table 1
Marginal Costs of Energy from PMDM (1995\$; m/kwh)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
Hour of Day:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
72																									
73	Month:	December																							
74	Day:	Saturday																							
75	1996	14.77	14.72	14.66	14.66	14.68	14.77	14.93	15.18	15.43	15.55	15.52	15.41	15.25	15.14	15.09	15.1	15.37	15.56	15.5	15.41	15.28	15.14	15	14.58
76	1997	16.24	16.16	16.17	16.13	16.16	16.26	16.4	16.64	16.91	17.03	16.99	16.91	16.74	16.66	16.6	16.6	16.85	17.04	16.94	16.87	16.76	16.62	16.4	16.11
77	1998	15.66	15.54	15.5	15.47	15.5	15.66	15.82	16.05	16.37	16.41	16.45	16.34	16.18	16.05	16	16.02	16.28	17.48	16.38	16.29	16.17	16.06	15.87	15.47
78	1999	14.77	14.6	14.57	14.58	14.61	14.75	14.94	15.21	15.5	15.6	15.49	15.27	15.21	15.13	15.15	15.42	15.6	15.53	15.46	15.35	15.2	14.97	14.53	
79	2000	13.46	13.34	13.28	13.23	13.32	13.45	13.63	13.9	14.24	14.42	14.39	14.25	14	13.89	13.8	13.85	14.14	14.36	14.28	14.15	14.03	13.9	13.67	13.23
80	Levelized:	14.3	14.2	14.2	14.2	14.2	14.3	14.5	14.7	15.0	15.1	15.1	15.0	14.8	14.7	14.7	14.7	14.9	15.1	15.0	15.0	14.8	14.7	14.5	14.2
81																									
82	Month:	January																							
83	Day:	Sunday																							
84	1997	13.15	13.1	13.01	12.98	13.08	13.17	13.36	13.61	13.79	13.95	13.94	13.87	13.73	13.64	13.59	13.61	13.77	14.05	14.01	13.95	13.82	13.67	13.35	12.89
85	1998	12.31	12.23	12.21	12.19	12.21	12.36	12.53	12.76	12.98	13.12	13.14	13.06	12.9	12.85	12.77	12.79	12.96	13.21	13.22	13.16	13.03	12.82	12.54	12.06
86	1999	14.09	14.01	13.97	13.94	13.98	14.1	14.29	14.5	14.75	14.84	14.84	14.81	14.63	14.56	14.46	14.48	14.66	14.95	14.92	14.91	14.77	14.55	14.28	13.82
87	2000	17.67	17.53	17.48	17.49	17.53	17.62	17.84	18.09	18.32	18.42	18.41	18.39	18.22	18.12	18.08	18.05	18.24	18.52	18.49	18.46	18.32	18.09	17.8	17.37
88	2001	20.61	20.34	20.17	20.15	20.32	20.69	20.98	21.32	21.57	21.65	21.67	21.66	21.46	21.34	21.23	21.22	21.45	21.78	21.76	21.67	21.53	21.29	20.93	20.12
89	Levelized:	14.7	14.6	14.5	14.5	14.6	14.7	14.9	15.1	15.4	15.5	15.5	15.4	15.3	15.2	15.1	15.1	15.3	15.6	15.6	15.5	15.4	15.2	14.9	14.4
90																									
91	Month:	January																							
92	Day:	Weekday																							
93	1997	13.07	12.99	13.03	13	13.13	13.49	13.97	14.32	14.36	14.31	14.22	14.14	13.97	13.94	13.89	13.87	14.03	14.29	14.26	14.13	14.01	13.8	13.51	12.97
94	1998	12.25	12.19	12.16	12.17	12.29	12.66	13.2	13.54	13.6	13.53	13.44	13.35	13.22	13.15	13.1	13.13	13.25	13.52	13.49	13.32	13.2	12.99	12.72	12.13
95	1999	14	13.94	13.92	13.94	14.03	14.38	14.92	15.28	15.32	15.25	15.19	15.06	14.92	14.85	14.85	14.81	14.97	15.26	15.2	15.09	14.97	14.73	14.44	13.92
96	2000	17.56	17.44	17.4	17.43	17.6	17.94	18.49	18.85	18.83	18.81	18.71	18.61	18.44	18.38	18.33	18.35	18.48	18.82	18.78	18.64	18.51	18.27	17.96	17.52
97	2001	20.13	19.9	19.84	19.93	20.25	20.99	21.67	22.09	22.13	22.12	21.96	21.86	21.68	21.58	21.53	21.53	21.72	22.09	22.03	21.89	21.69	21.46	21.06	20.2
98	Levelized:	14.5	14.4	14.4	14.4	14.6	15.0	15.5	15.9	15.9	15.9	15.8	15.7	15.5	15.5	15.4	15.4	15.6	15.9	15.8	15.7	15.5	15.3	15.0	14.5
99																									
100	Month:	January																							
101	Day:	Saturday																							
102	1997	13.21	13.12	13.1	13.05	13.11	13.22	13.44	13.7	13.98	14.08	14.1	14.04	13.84	13.71	13.65	13.64	13.77	14.05	13.99	13.89	13.82	13.64	13.42	12.96
103	1998	12.39	12.28	12.19	12.2	12.22	12.39	12.57	12.87	13.11	13.24	13.25	13.17	12.98	12.87	12.81	12.77	12.96	13.22	13.16	13.05	12.95	12.77	12.56	12.1
104	1999	14.16	14.04	14.03	14.02	14.05	14.16	14.38	14.61	14.91	15.06	15.06	14.94	14.77	14.67	14.53	14.54	14.74	15.01	14.97	14.82	14.73	14.58	14.33	13.94
105	2000	17.71	17.58	17.56	17.57	17.6	17.72	17.89	18.19	18.48	18.59	18.58	18.51	18.33	18.21	18.08	18.08	18.29	18.5	18.38	18.26	18.13	17.86	17.51	
106	2001	20.51	20.23	20.05	20.06	20.25	20.62	21.02	21.37	21.7	21.87	21.82	21.73	21.53	21.38	21.25	21.26	21.47	21.76	21.75	21.6	21.46	21.23	20.94	20.22
107	Levelized:	14.7	14.6	14.5	14.5	14.6	14.7	15.0	15.2	15.5	15.6	15.6	15.5	15.4	15.3	15.2	15.1	15.3	15.6	15.5	15.4	15.3	15.2	14.9	14.5
108																									
109	Month:	February																							
110	Day:	Sunday																							
111	1997	15.21	15.12	15.1	15.08	15.1	15.23	15.39	15.65	15.85	15.9	15.83	15.82	15.68	15.62	15.54	15.54	15.63	15.9	15.97	15.96	15.81	15.63	15.42	14.99
112	1998	10.97	10.89	10.87	10.84	10.88	10.98	11.13	11.41	11.62	11.68	11.66	11.6	11.46	11.38	11.28	11.3	11.42	11.7	11.79	11.76	11.58	11.43	11.17	10.67
113	1999	14.96	14.85	14.77	14.82	14.87	15.04	15.22	15.46	15.69	15.72	15.72	15.63	15.54	15.44	15.33	15.33	15.45	15.68	15.77	15.75	15.64	15.47	15.22	14.8
114	2000	19.32	18.96	18.8	18.89	19.13	19.42	19.64	19.9	20.15	20.18	20.16	20.09	19.91	19.83	19.74	19.76	19.89	20.09	20.22	20.17	20.06	19.94	19.62	18.92
115	2001	19.57	19.3	19.18	19.18	19.31	19.79	20.29	20.71	20.95	21.05	21.05	20.93	20.72	20.55	20.44	20.38	20.56	20.93	21.1	21.03	20.91	20.64	20.23	19.27
116	Levelized:	15.1	15.0	14.9	14.9	15.0	15.2	15.4	15.7	15.9	16.0	16.0	15.9	15.7	15.7	15.6	15.6	15.7	15.9	16.0	16.0	15.9	15.7	15.4	14.9
117																									
118	Month:	February																							
119	Day:	Weekday																							
120	1997	15.15	15.1	15.08	15.09	15.24	15.48	16.01	16.24	16.32	16.2	16.14	15.99	15.9	15.86	15.8	15.79	15.86	16.13	16.17	16.07	15.99	15.77	15.55	15.08
121	1998	10.98	10.89	10.88	10.9	11	11.31	11.84	12.22	12.21	12.1	11.96	11.89	11.76	11.73	11.65	11.65	11.69	11.95	12.08	11.98	11.83	11.59	11.33	10.84
122	1999	14.96	14.89	14.87	14.89	15.01	15.38	15.89	16.14	16.17	16.12	16.04	15.91	15.79	15.71	15.67	15.63	15.71	15.98	16.06	15.95	15.83	15.64	15.38	14.98
123	2000	19.25	19.05	19.05	19.11	19.37	19.73	20.24	20.61	20.61	20.57	20.47	20.32	20.19	20.11	20.03	20.01	20.07	20.39	20.53	20.38	20.25	20.02	19.75	19.35
124	2001	19.53	19.33	19.31	19.42	19.81	20.46	21.1	21.51	21.5	21.43	21.27	21.15	21.03	20.95	20.81	20.77	20.93	21.23	21.36	21.25	21.09	20.84	20.5	19.8
125	Levelized:	15.1	15.0	15.0	15.0	15.2	15.6	16.1	16.4	16.4	16.3	16.2	16.1	16.0	15.9	15.9	15.8	15.9	16.2	16.3	16.2	16.1	15.8	15.6	15.1
126																									
127	Month:	February																							
128	Day:	Saturday																							
129	1997	15.21	15.15	15.07	15.1	15.14	15.26	15.41	15.7	15.94	16.01	15.99	15.88	15.72	15.66	15.57	15.53	15.62	15.83	15.9	15.86	15.71	15.63	15.41	15.01

Table 1
Marginal Costs of Energy from PMDAM (1995\$; m/kwh)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
Hour of Day:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
145	Month:	March																							
146	Day:	Weekday																							
147	1997	15.81	15.65	15.62	15.64	15.83	16.25	16.79	17.12	17.13	17.09	17.02	16.89	16.78	16.73	16.64	16.6	16.64	16.81	17.02	16.97	16.81	16.57	16.29	15.8
148	1998	13.12	12.97	12.94	12.96	13.18	13.63	14.13	14.43	14.49	14.4	14.33	14.23	14.12	14.06	13.98	13.96	13.98	14.12	14.35	14.29	14.15	13.9	13.66	13.17
149	1999	15.5	15.35	15.3	15.36	15.64	16.15	16.7	17.01	17.02	16.97	16.87	16.7	16.62	16.56	16.52	16.42	16.5	16.63	16.86	16.78	16.65	16.44	16.21	15.67
150	2000	18.4	17.92	17.88	18.04	18.72	19.62	20.29	20.63	20.67	20.56	20.46	20.36	20.19	20.1	20.05	20.01	20.04	20.22	20.45	20.43	20.23	19.98	19.68	18.93
151	2001	18.88	18.22	18.1	18.36	19.35	20.73	21.58	21.97	22.02	21.91	21.76	21.62	21.45	21.4	21.24	21.17	21.31	21.52	21.77	21.75	21.52	21.26	20.75	19.64
152	Levelized:	15.5	15.2	15.2	15.3	15.7	16.4	16.9	17.3	17.3	17.2	17.1	17.0	16.9	16.8	16.8	16.7	16.8	16.9	17.1	17.1	16.9	16.7	16.4	15.8
153	Month:	March																							
154	Day:	Saturday																							
155	1997	15.97	15.81	15.72	15.7	15.79	15.97	16.25	16.52	16.74	16.8	16.76	16.65	16.48	16.4	16.33	16.29	16.34	16.5	16.64	16.66	16.56	16.37	16.18	15.79
156	1998	13.32	13.22	13.17	13.11	13.19	13.38	13.61	13.91	14.05	14.12	14.1	13.96	13.85	13.74	13.64	13.62	13.7	13.88	14.05	14.01	13.91	13.73	13.53	13.14
157	1999	15.7	15.47	15.39	15.41	15.53	15.83	16.09	16.42	16.64	16.7	16.65	16.49	16.4	16.27	16.18	16.15	16.22	16.32	16.55	16.51	16.42	16.25	16.05	15.56
158	2000	18.96	18.21	18	18	18.44	19.15	19.61	19.96	20.16	20.24	20.19	20.08	19.93	19.77	19.64	19.62	19.69	19.89	20.14	20.09	19.97	19.79	19.49	18.79
159	2001	19.37	18.61	18.35	18.29	18.79	19.81	20.7	21.22	21.53	21.61	21.47	21.37	21.15	20.89	20.7	20.65	20.82	21.09	21.37	21.38	21.23	20.96	20.49	19.26
160	Levelized:	15.8	15.4	15.3	15.3	15.5	15.9	16.3	16.7	16.9	16.9	16.9	16.8	16.6	16.5	16.4	16.4	16.4	16.6	16.8	16.8	16.7	16.5	16.2	15.6
161	Month:	April																							
162	Day:	Sunday																							
163	1997	14.11	14	13.61	13.93	13.92	14.02	14.19	14.47	14.67	14.77	14.78	14.73	14.63	14.56	14.49	14.44	14.46	14.58	14.7	14.78	14.8	14.67	14.36	13.87
164	1998	13.79	13.76	13.46	13.67	13.73	13.97	14.2	14.37	14.46	14.48	14.44	14.32	14.25	14.18	14.16	14.18	14.18	14.3	14.41	14.49	14.53	14.38	14.07	13.64
165	1999	15.75	15.67	15.08	15.59	15.63	15.91	16.17	16.33	16.42	16.44	16.38	16.29	16.14	16.11	16.08	16.09	16.17	16.3	16.37	16.44	16.26	16.02	15.6	
166	2000	17.4	17.29	16.24	17.19	17.18	17.37	17.67	17.99	18.19	18.27	18.27	18.28	18.07	17.98	17.94	17.82	17.96	18.11	18.18	18.26	18.12	17.83	17.31	
167	2001	17.49	17.3	16.49	17.16	17.2	17.36	17.7	18.03	18.29	18.39	18.4	18.39	18.18	18.1	17.93	17.91	17.97	18.09	18.2	18.33	18.24	17.86	17.37	
168	Levelized:	14.9	14.8	14.2	14.7	14.7	14.8	15.1	15.3	15.5	15.6	15.6	15.5	15.4	15.3	15.3	15.3	15.3	15.4	15.5	15.6	15.6	15.5	15.2	14.8
169	Month:	April																							
170	Day:	Weekday																							
171	1997	13.92	13.81	13.78	13.75	13.86	14.2	14.69	15.06	15.07	15.11	15.06	14.98	14.9	14.84	14.76	14.76	14.71	14.75	14.82	14.88	14.83	14.63	14.3	13.77
172	1998	13.58	13.53	13.47	13.45	13.6	13.86	14.36	14.67	14.72	14.76	14.69	14.57	14.52	14.49	14.41	14.38	14.37	14.44	14.46	14.52	14.49	14.3	14	13.54
173	1999	15.43	15.29	15.17	15.2	15.39	15.75	16.26	16.58	16.61	16.6	16.61	16.5	16.44	16.37	16.34	16.26	16.31	16.27	16.42	16.43	16.2	15.97	15.46	
174	2000	17	16.84	16.72	16.77	16.97	17.52	18.16	18.49	18.56	18.6	18.47	18.36	18.29	18.21	18.14	18.08	18.13	18.12	18.28	18.24	18.05	17.73	17.19	
175	2001	17.13	16.88	16.83	16.86	17.1	17.64	18.26	18.68	18.65	18.72	18.67	18.52	18.42	18.42	18.3	18.19	18.25	18.29	18.38	18.43	18.18	17.85	17.26	
176	Levelized:	14.6	14.5	14.4	14.4	14.6	15.0	15.5	15.8	15.9	15.9	15.8	15.7	15.7	15.6	15.6	15.5	15.5	15.5	15.6	15.7	15.6	15.4	15.2	14.6
177	Month:	April																							
178	Day:	Saturday																							
179	1997	14.13	14.03	13.91	13.96	13.98	14.06	14.29	14.66	14.86	14.96	14.95	14.89	14.75	14.66	14.59	14.55	14.59	14.68	14.77	14.79	14.77	14.63	14.34	13.89
180	1998	13.83	13.74	13.64	13.67	13.69	13.78	13.97	14.27	14.5	14.66	14.64	14.53	14.44	14.33	14.24	14.18	14.26	14.29	14.39	14.44	14.41	14.25	14.03	13.63
181	1999	15.82	15.7	15.58	15.62	15.71	15.97	16.28	16.48	16.58	16.58	16.5	16.36	16.25	16.2	16.14	16.12	16.21	16.35	16.34	16.33	16.18	16	15.63	
182	2000	17.47	17.32	17.17	17.2	17.26	17.44	17.74	18.04	18.31	18.42	18.44	18.33	18.15	18.09	17.94	17.97	18.06	18.12	18.15	18.21	18.06	17.71	17.38	
183	2001	17.47	17.26	17.16	17.18	17.29	17.46	17.77	18.22	18.43	18.55	18.52	18.53	18.31	18.2	18.09	18.06	18.05	18.23	18.29	18.35	18.35	18.16	17.87	17.41
184	Levelized:	14.9	14.8	14.7	14.7	14.8	14.9	15.1	15.5	15.7	15.8	15.8	15.7	15.6	15.5	15.4	15.4	15.4	15.5	15.5	15.6	15.6	15.4	15.2	14.8
185	Month:	May																							
186	Day:	Sunday																							
187	1997	6.74	6.57	6.52	6.5	6.46	6.47	6.64	6.93	7.25	7.41	7.51	7.49	7.36	7.32	7.26	7.25	7.29	7.33	7.31	7.38	7.49	7.38	7.06	6.21
188	1998	6.34	6.21	6.13	6.09	6.1	6.1	6.24	6.53	6.81	6.99	7.07	7.07	6.9	6.87	6.78	6.78	6.83	6.86	6.88	6.89	6.99	6.91	6.65	5.88
189	1999	7.57	7.47	7.39	7.39	7.47	7.8	8.4	9.21	9.49	9.34	9.16	8.99	8.62	8.6	8.55	8.5	8.51	8.5	8.46	8.45	8.48	8.39	8.05	7.33
190	2000	7.45	7.31	7.25	7.25	7.33	7.7	8.26	8.52	8.98	9.78	9.31	8.85	8.45	8.41	8.38	8.35	8.37	8.35	8.31	8.31	8.36	8.23	7.9	7.2
191	2001	8.21	8.1	8.05	8.05	8.14	8.43	8.99	9.89	10.33	10.15	9.88	9.51	9.24	9.22	9.17	9.12	9.12	9.14	9.08	9.07	9.13	8.98	8.68	8.04
192	Levelized:	6.9	6.8	6.7	6.7	6.7	6.7	6.8	7.1	7.7	8.5	8.7	8.5	8.2	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.7	7.4	6.6
193	Month:	May																							
194	Day:	Weekday																							
195	1997	6.7	6.55	6.51	6.51	6.61	6.94	7.61	8.19	8.47	8.39	8.28	8.12	7.96	7.9	7.87	7.86	7.82	7.83	7.75	7.75	7.82	7.64	7.23	6.4
196	1998	6.32	6.22	6.14	6.13	6.25	6.56	7.18	7.87	8.13	8.07	7.88	7.74	7.44	7.42	7.36	7.34	7.32	7.32	7.27	7.27	7.3	7.2	6.84	6.06
197	1999	7.57	7.47	7.39	7.39	7.47	7.8	8.4	9.21	9.49	9.34	9.16	8.99	8.62	8.6	8.55	8.5	8.51	8.5	8.46	8.45	8.48	8.39	8.05	7.33
198	2000	7.45	7.31	7.25	7.25	7.33	7.7	8.26	8.52	8.98	9.78	9.31	8.85	8.45	8.41	8.38	8.35	8.37	8.35	8.31	8.31	8.36	8.23	7.9	7.2
199	2001	8.21	8.1	8.05	8.05	8.14	8.43	8.99	9.89	10.33	10.15	9.88	9.51	9.24	9.22	9.17	9.12	9.12	9.14	9.08	9.07	9.13	8.98	8.68	8.04
200	Levelized:	6.9	6.8	6.7	6.7	6.8	7.1	7.7	8.5	8.8	8.7	8.5	8.2	7.9											

Table 1
Marginal Costs of Energy from PMDAM (1995\$; m/kwh)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	
Hour of Day:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
218	Day: Sunday																									
219	1997	8.51	8.38	8.3	8.22	8.24	8.19	8.32	8.6	8.88	9.1	9.21	9.25	9.17	9.17	9.16	9.15	9.19	9.21	9.17	9.16	9.23	9.14	8.86	8.1	
220	1998	7.2	7.02	6.94	6.89	6.85	6.83	6.94	7.25	7.53	7.77	7.91	7.93	7.81	7.83	7.8	7.78	7.83	7.82	7.81	7.78	7.84	7.79	7.54	6.73	
221	1999	7.53	7.35	7.25	7.18	7.16	7.11	7.28	7.55	7.84	8.07	8.2	8.23	8.14	8.09	8.09	8.06	8.11	8.12	8.09	8.1	8.14	8.11	7.84	7.02	
222	2000	8.57	8.41	8.34	8.26	8.23	8.2	8.36	8.57	8.88	9.07	9.17	9.2	9.1	9.1	9.07	9.07	9.1	9.14	9.07	9.11	9.15	9.13	8.86	8.14	
223	2001	8.86	8.67	8.62	8.56	8.52	8.48	8.62	8.88	9.13	9.32	9.42	9.47	9.37	9.35	9.33	9.34	9.34	9.38	9.37	9.35	9.41	9.35	9.1	8.45	
224	Levelized:	7.7	7.6	7.5	7.4	7.4	7.4	7.5	7.8	8.1	8.3	8.4	8.4	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.0	7.3	
225	Month: June																									
226	Day: Weekday																									
227	1997	8.5	8.4	8.29	8.27	8.34	8.58	9.09	9.48	9.67	9.78	9.84	9.83	9.69	9.69	9.7	9.65	9.62	9.59	9.49	9.43	9.42	9.31	9.01	8.28	
228	1998	7.16	7.02	6.92	6.9	6.99	7.23	7.76	8.12	8.32	8.46	8.49	8.44	8.27	8.25	8.24	8.21	8.22	8.21	8.09	8.05	8	7.93	7.68	6.89	
229	1999	7.52	7.38	7.28	7.26	7.32	7.58	8.09	8.48	8.65	8.72	8.77	8.76	8.59	8.56	8.55	8.51	8.5	8.46	8.41	8.34	8.34	8.28	8	7.23	
230	2000	8.56	8.43	8.34	8.32	8.38	8.6	9.04	9.42	9.59	9.7	9.73	9.77	9.57	9.56	9.55	9.53	9.48	9.49	9.4	9.35	9.32	9.27	9.03	8.37	
231	2001	8.82	8.7	8.62	8.63	8.68	8.87	9.28	9.67	9.85	9.92	9.96	9.96	9.81	9.79	9.77	9.75	9.73	9.7	9.63	9.59	9.55	9.53	9.26	8.65	
232	Levelized:	7.7	7.6	7.5	7.5	7.6	7.8	8.2	8.6	8.8	8.9	8.9	8.9	8.8	8.7	8.7	8.7	8.7	8.7	8.6	8.5	8.5	8.4	8.2	7.5	
233	Month: June																									
234	Day: Saturday																									
235	1997	8.63	8.45	8.39	8.31	8.28	8.31	8.52	8.84	9.17	9.37	9.44	9.46	9.32	9.32	9.25	9.27	9.27	9.27	9.2	9.17	9.16	9.12	8.85	8.12	
236	1998	7.29	7.13	7.02	6.93	6.95	6.99	7.16	7.53	7.83	8.05	8.15	8.13	7.97	7.92	7.85	7.86	7.9	7.89	7.82	7.79	7.83	7.76	7.51	6.77	
237	1999	7.64	7.46	7.32	7.3	7.28	7.29	7.48	7.79	8.15	8.37	8.45	8.43	8.26	8.22	8.21	8.16	8.2	8.2	8.16	8.11	8.1	8.08	7.86	7.1	
238	2000	8.66	8.51	8.41	8.36	8.35	8.35	8.52	8.82	9.12	9.33	9.42	9.42	9.26	9.24	9.21	9.16	9.2	9.21	9.16	9.09	9.12	9.08	8.87	8.18	
239	2001	8.92	8.79	8.71	8.66	8.65	8.66	8.83	9.09	9.38	9.61	9.65	9.66	9.52	9.47	9.45	9.4	9.45	9.46	9.39	9.37	9.37	9.33	9.12	8.52	
240	Levelized:	7.8	7.7	7.6	7.5	7.5	7.5	7.7	8.0	8.3	8.5	8.6	8.6	8.4	8.4	8.4	8.4	8.4	8.4	8.3	8.3	8.3	8.3	8.0	7.4	
241	Month: July																									
242	Day: Sunday																									
243	1997	9.37	9.19	9.09	9.03	9.05	8.99	9.05	9.28	9.56	9.78	9.87	9.95	9.88	9.86	9.86	9.86	9.9	9.92	9.87	9.82	9.84	9.77	9.6	8.99	
244	1998	8.5	8.33	8.24	8.21	8.17	8.1	8.19	8.44	8.69	8.9	9.05	9.09	9.02	9.01	8.99	9.01	9.02	9.05	9.02	8.96	9	8.97	8.77	8.14	
245	1999	8.76	8.65	8.53	8.51	8.47	8.44	8.52	8.72	8.98	9.19	9.29	9.38	9.3	9.28	9.29	9.27	9.32	9.3	9.29	9.24	9.28	9.23	9.05	8.45	
246	2000	9.92	9.76	9.69	9.61	9.62	9.57	9.64	9.82	10.07	10.24	10.37	10.39	10.34	10.36	10.37	10.35	10.37	10.37	10.35	10.33	10.35	10.31	10.13	9.6	
247	2001	10.23	10.14	10.06	9.99	9.99	9.95	10.01	10.19	10.46	10.61	10.72	10.76	10.68	10.72	10.74	10.69	10.74	10.74	10.69	10.67	10.67	10.52	10.35	10.03	
248	Levelized:	8.9	8.8	8.7	8.6	8.6	8.6	8.6	8.8	9.1	9.3	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.3	9.4	9.3	9.2	8.6	
249	Month: July																									
250	Day: Weekday																									
251	1997	9.35	9.22	9.17	9.12	9.14	9.33	9.66	9.96	10.15	10.29	10.35	10.38	10.24	10.26	10.25	10.25	10.23	10.2	10.14	10.04	10.03	9.98	9.75	9.19	
252	1998	8.51	8.35	8.29	8.28	8.29	8.46	8.8	9.13	9.34	9.43	9.53	9.52	9.36	9.39	9.4	9.34	9.35	9.34	9.25	9.21	9.18	9.14	8.9	8.3	
253	1999	8.81	8.68	8.61	8.57	8.6	8.77	9.08	9.39	9.58	9.67	9.72	9.76	9.62	9.63	9.62	9.61	9.57	9.52	9.46	9.45	9.35	9.21	8.66		
254	2000	9.9	9.79	9.69	9.69	9.71	9.86	10.16	10.43	10.61	10.72	10.8	10.81	10.74	10.76	10.75	10.7	10.7	10.68	10.62	10.54	10.51	10.44	10.22	9.8	
255	2001	10.26	10.12	10.08	10.07	10.06	10.21	10.51	10.75	10.96	11.07	11.18	11.16	11.06	11.09	11.1	11.07	11.06	10.99	10.94	10.87	10.84	10.76	10.58	10.15	
256	Levelized:	8.9	8.8	8.7	8.7	8.7	8.9	9.2	9.5	9.6	9.7	9.8	9.8	9.7	9.7	9.7	9.7	9.7	9.7	9.6	9.5	9.5	9.5	9.3	8.8	
257	Month: July																									
258	Day: Saturday																									
259	1997	9.43	9.31	9.19	9.14	9.11	9.13	9.28	9.51	9.75	9.95	10.05	10.07	10	9.97	9.93	9.95	9.95	9.96	9.92	9.88	9.85	9.8	9.65	9.03	
260	1998	8.56	8.4	8.31	8.26	8.24	8.24	8.38	8.64	8.9	9.1	9.19	9.19	9.1	9.09	9.07	9.07	9.06	9.09	9.04	9.01	8.97	8.95	8.76	8.15	
261	1999	8.91	8.73	8.65	8.6	8.56	8.6	8.68	8.96	9.24	9.4	9.5	9.5	9.41	9.39	9.35	9.36	9.36	9.37	9.33	9.26	9.28	9.23	9.09	8.53	
262	2000	9.97	9.81	9.73	9.72	9.67	9.69	9.78	10.01	10.27	10.44	10.53	10.54	10.46	10.45	10.42	10.43	10.44	10.44	10.37	10.33	10.34	10.28	10.13	9.65	
263	2001	10.35	10.16	10.1	10.08	10.02	10.05	10.17	10.35	10.61	10.82	10.88	10.9	10.79	10.79	10.76	10.75	10.76	10.76	10.8	10.74	10.69	10.7	10.64	10.49	10.04
264	Levelized:	9.0	8.8	8.8	8.7	8.7	8.7	8.8	9.0	9.3	9.5	9.5	9.6	9.5	9.5	9.4	9.4	9.4	9.5	9.4	9.4	9.4	9.3	9.2	8.6	
265	Month: August																									
266	Day: Sunday																									
267	1997	12.62	12.54	12.43	12.39	12.34	12.36	12.39	12.62	12.84	13.06	13.17	13.26	13.18	13.2	13.21	13.23	13.26	13.22	13.2	13.22	13.22	13.12	12.82	12.31	
268	1998	12.19	12.08	12.01	11.96	11.94	11.93	11.92	12.18	12.42	12.68	12.77	12.81	12.77	12.77	12.78	12.78	12.81	12.83	12.79	12.77	12.84	12.7	12.41	11.89	
269	1999	12.57	12.47	12.38	12.29	12.32	12.29	12.33	12.58	12.8	12.99	13.08	13.16	13.12	13.11	13.15	13.17	13.17	13.17	13.16	13.12	13.15	13.14	12.82	12.32	
270	2000	12.73	12.62	12.54	12.49	12.46	12.5	12.51	12.65	12.96	13.1	13.22	13.29	13.25	13.28	13.25	13.27	13.28	13.3	13.27	13.29	13.32	13.21	12.95	12.54	
271	2001	13.16	13.06	12.99	12.92	12.93	12.92	12.91	13.15	13.39	13.54	13.68	13.76	13.69	13.69	13.69	13.72	13.74	13.72	13.69	13.69	13.71	13.63	13.38	12.99	
272	Levelized:	12.1	12.0	11.9	11.8	11.8	11.8	11.8	12.0	12.3	12.5	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.5	12.3	11.8	
273	Month: August																									
274	Day: Weekday																									
275	1997	12.59	12.46	12.42	12.4	12.41	12.61	12.93	13.18	13.41	13.53	13.66	13.69	13.59	13.65	13.62	13.6	13.59	13.54	13.45	13.43	13.37	13.24	12.94	12.4	

Table 1
Marginal Costs of Energy from PMDAM (1995\$; m/kwh)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
Hour of Day:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
291	1997	12.69	12.53	12.45	12.44	12.43	12.42	12.52	12.75	13.03	13.23	13.33	13.39	13.31	13.32	13.31	13.28	13.3	13.32	13.22	13.16	13.2	13.07	12.86	12.39
292	1998	12.28	12.13	12.06	11.99	11.97	12	12.09	12.34	12.6	12.81	12.9	12.95	12.85	12.86	12.88	12.87	12.89	12.88	12.81	12.78	12.79	12.68	12.47	11.94
293	1999	12.63	12.49	12.41	12.39	12.37	12.35	12.47	12.7	12.95	13.17	13.24	13.31	13.2	13.21	13.21	13.24	13.24	13.22	13.11	13.12	13.11	13.03	12.82	12.37
294	2000	12.77	12.68	12.6	12.55	12.53	12.55	12.62	12.86	13.09	13.28	13.41	13.48	13.37	13.37	13.35	13.36	13.39	13.35	13.29	13.28	13.27	13.16	12.96	12.62
295	2001	13.23	13.1	13.05	13.01	12.99	13.01	13.05	13.26	13.51	13.72	13.82	13.85	13.77	13.78	13.75	13.79	13.78	13.76	13.68	13.67	13.68	13.56	13.39	13.06
296	Levelized:	12.1	12.0	11.9	11.9	11.9	11.9	12.0	12.2	12.4	12.6	12.7	12.8	12.7	12.7	12.7	12.7	12.7	12.7	12.6	12.6	12.6	12.5	12.3	11.9
297																									
298	Month:	September																							
299	Day:	Sunday																							
300	1997	16.08	15.75	15.38	15.25	15.16	15.37	15.74	16.38	16.75	16.95	17.01	17.08	17.03	17	16.94	16.95	17	17.04	17.06	17.14	17.08	16.89	16.45	14.47
301	1998	15.36	15.11	14.88	14.69	14.63	14.81	15.06	15.56	15.86	16.07	16.19	16.22	16.14	16.15	16.14	16.17	16.16	16.16	16.23	16.27	16.27	16.01	15.69	14.29
302	1999	14.19	13.91	13.67	13.6	13.51	13.68	13.93	14.39	14.73	14.9	15.05	15.08	15.02	15.02	14.96	15.06	15.06	15.08	15.05	15.12	15.11	14.92	14.54	13.38
303	2000	13.05	12.9	12.78	12.71	12.65	12.74	12.81	13.16	13.49	13.72	13.77	13.83	13.79	13.81	13.77	13.79	13.83	13.83	13.83	13.93	13.88	13.67	13.33	12.57
304	2001	15.03	14.71	14.52	14.38	14.36	14.52	14.74	15.2	15.48	15.73	15.82	15.86	15.75	15.77	15.79	15.73	15.78	15.82	15.78	15.91	15.86	15.67	15.36	14.43
305	Levelized:	14.1	13.9	13.6	13.5	13.5	13.6	13.8	14.3	14.6	14.8	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	15.0	15.0	14.8	14.4	13.2
306																									
307	Month:	September																							
308	Day:	Weekday																							
309	1997	15.84	15.49	15.21	15.11	15.37	16.33	16.94	17.22	17.33	17.41	17.47	17.44	17.38	17.41	17.38	17.38	17.35	17.29	17.29	17.31	17.24	16.97	16.63	15.41
310	1998	15.19	14.88	14.68	14.62	14.76	15.49	16.03	16.34	16.44	16.53	16.54	16.54	16.45	16.49	16.55	16.48	16.48	16.42	16.36	16.43	16.35	16.1	15.83	14.85
311	1999	13.96	13.65	13.51	13.48	13.61	14.42	14.92	15.21	15.34	15.4	15.45	15.43	15.37	15.36	15.4	15.35	15.36	15.34	15.3	15.39	15.31	14.99	14.68	13.85
312	2000	12.94	12.75	12.61	12.57	12.79	13.28	13.69	13.99	14.12	14.17	14.2	14.22	14.13	14.19	14.19	14.17	14.14	14.09	14.06	14.11	14.02	13.83	13.51	12.9
313	2001	14.87	14.53	14.31	14.2	14.56	15.19	15.66	15.97	16.12	16.18	16.21	16.19	16.15	16.17	16.15	16.13	16.08	16.06	16.06	16.1	15.98	15.73	15.42	14.8
314	Levelized:	13.9	13.7	13.5	13.4	13.6	14.3	14.8	15.1	15.2	15.3	15.3	15.3	15.2	15.2	15.3	15.2	15.2	15.2	15.1	15.2	15.1	14.9	14.6	13.7
315																									
316	Month:	September																							
317	Day:	Saturday																							
318	1997	16.28	15.94	15.69	15.48	15.51	15.75	16.18	16.67	16.95	17.14	17.2	17.21	17.12	17.11	17.1	17.09	17.1	17.1	17.04	17.12	17.04	16.89	16.56	15.4
319	1998	15.47	15.18	14.95	14.77	14.76	14.97	15.27	15.76	16.05	16.22	16.33	16.34	16.22	16.24	16.2	16.19	16.2	16.16	16.16	16.19	16.14	16.03	15.67	14.49
320	1999	14.39	14.07	13.83	13.66	13.69	13.9	14.17	14.57	14.96	15.13	15.19	15.22	15.15	15.12	15.12	15.11	15.08	15.08	15.07	15.14	15.07	14.87	14.59	13.86
321	2000	13.14	12.93	12.84	12.73	12.75	12.85	13	13.39	13.69	13.86	13.93	13.93	13.88	13.87	13.88	13.86	13.88	13.88	13.82	13.89	13.82	13.67	13.38	12.84
322	2001	15.14	14.86	14.6	14.49	14.49	14.72	14.96	15.39	15.73	15.87	15.93	15.95	15.87	15.83	15.83	15.81	15.84	15.85	15.78	15.85	15.8	15.61	15.34	14.65
323	Levelized:	14.3	14.0	13.8	13.6	13.6	13.8	14.1	14.5	14.8	15.0	15.0	15.1	15.0	15.0	15.0	14.9	15.0	14.9	14.9	15.0	14.9	14.8	14.5	13.6

Column A: Calendar Years

Columns B-Y: Marginal costs of energy to BPA from PMDAM, averaged over 50 games, 1995 dollars, levelization at a real discount rate of 4.75%; values by game appear in Section I of the Documentation for the Marginal Cost Analysis (WP-96-FS-BPA-04A)

Table 8
Cluster Analysis
Annual Load-Weighted Average Marginal Costs of Energy

42.00455 168

	A	B	C	D	E	F	G	H	I	16.49411
	<u>Day-Type</u>	<u>Hour</u>	<u>Monday</u> (m/kwh)	<u>Tuesday</u> (m/kwh)	<u>Wednesday</u> (m/kwh)	<u>Thursday</u> (m/kwh)	<u>Friday</u> (m/kwh)	<u>Pseudo-F</u>	<u>Max Psd-F</u>	
1	Weekday	9	14.03	14.03	14.03	14.03	14.03			
2	Weekday	10	14.00	14.00	14.00	14.00	14.00	10.073		
3	Weekday	8	13.97	13.97	13.97	13.97	13.97	20.911		
4	Weekday	11	13.93	13.93	13.93	13.93	13.93	32.884		
5	Weekday	19	13.83	13.83	13.83	13.83	13.83	45.728		
6	Weekday	12	13.82	13.82	13.82	13.82	13.82	56.084		
7	Weekday	18	13.80	13.80	13.80	13.80	13.80	68.513		
8	Weekday	20	13.78	13.78	13.78	13.78	13.78	82.513		
9	Saturday	10	13.74					98.186		
10	Saturday	11	13.73					101.121		
11	Weekday	21	13.68	13.68	13.68	13.68	13.68	104.062		
12	Weekday	13	13.68	13.68	13.68	13.68	13.68	116.753		
13	Weekday	17	13.66	13.66	13.66	13.66	13.66	132.344		
14	Saturday	12	13.65					150.801		
15	Weekday	14	13.64	13.64	13.64	13.64	13.64	154.798		
16	Saturday	9	13.62					176.964		
17	Weekday	7	13.61	13.61	13.61	13.61	13.61	181.634		
18	Weekday	15	13.60	13.60	13.60	13.60	13.60	207.322		
19	Sunday	20	13.59					239.831		
20	Saturday	19	13.59					247.121		
21	Sunday	19	13.59					254.871		
22	Weekday	16	13.58	13.58	13.58	13.58	13.58	263.094		
23	Saturday	18	13.57					312.948		
24	Sunday	11	13.56					324.379		
25	Sunday	10	13.56					336.650		
26	Saturday	20	13.55					349.835		
27	Sunday	21	13.54					363.562		
28	Sunday	18	13.54					377.417		
29	Sunday	12	13.54					392.470		
30	Saturday	13	13.50					408.835		
31	Saturday	21	13.48					423.064		
32	Sunday	9	13.47					437.553		
33	Weekday	22	13.46	13.46	13.46	13.46	13.46	451.836		
34	Saturday	17	13.44					540.555		
35	Saturday	14	13.41					561.293		
36	Sunday	13	13.39					579.921		
37	Sunday	17	13.39					598.687		
38	Saturday	8	13.37					618.297		
39	Sunday	22	13.35					637.365		
40	Saturday	15	13.34					654.442		
41	Saturday	16	13.34					672.269		
42	Sunday	14	13.33					691.154		
43	Saturday	22	13.31					711.606		
44	Sunday	16	13.28					730.494		
45	Sunday	15	13.28					744.226		
46	Sunday	8	13.26					759.714		
47	Weekday	23	13.17	13.17	13.17	13.17	13.17	772.534	772.534	13.21263
48	Weekday	6	13.09	13.09	13.09	13.09	13.09	748.172		

Table 9
Hours of the Week Designated as Higher (H) or Lower (L) in Cluster Analysis

2

	A	B	C	D	E	F	G
	<u>Hour</u>	<u>Sunday</u>		<u>Weekday</u>		<u>Saturday</u>	
	<u>of Day</u>	<u>Marginal Cost</u> (m/kwh)	<u>Designation</u>	<u>Marginal Cost</u> (m/kwh)	<u>Designation</u>	<u>Marginal Cost</u> (m/kwh)	<u>Designation</u>
1							
2							
3							
4							
5							
6	1	12.80	L	12.69	L	12.87	L
7	2	12.66	L	12.54	L	12.71	L
8	3	12.52	L	12.49	L	12.61	L
9	4	12.54	L	12.51	L	12.59	L
10	5	12.59	L	12.68	L	12.65	L
11	6	12.74	L	13.09	L	12.82	L
12	7	12.97	L	13.61	H	13.06	L
13	8	13.26	H	13.97	H	13.37	H
14	9	13.47	H	14.03	H	13.62	H
15	10	13.56	H	14.00	H	13.74	H
16	11	13.56	H	13.93	H	13.73	H
17	12	13.54	H	13.82	H	13.65	H
18	13	13.39	H	13.68	H	13.50	H
19	14	13.33	H	13.64	H	13.41	H
20	15	13.28	H	13.60	H	13.34	H
21	16	13.28	H	13.58	H	13.34	H
22	17	13.39	H	13.66	H	13.44	H
23	18	13.54	H	13.80	H	13.57	H
24	19	13.59	H	13.83	H	13.59	H
25	20	13.59	H	13.78	H	13.55	H
26	21	13.54	H	13.68	H	13.48	H
27	22	13.35	H	13.46	H	13.31	H
28	23	13.05	L	13.17	L	13.08	L
29	24	12.42	L	12.59	L	12.55	L

Table 8
Cluster Analysis
Annual Load-Weighted Average Marginal Costs of Energy

42.00455 168

	A	B	C	D	E	F	G	H	I	
	<u>Day-Type</u>	<u>Hour</u>	<u>Monday</u> (m/kwh)	<u>Tuesday</u> (m/kwh)	<u>Wednesday</u> (m/kwh)	<u>Thursday</u> (m/kwh)	<u>Friday</u> (m/kwh)	<u>Pseudo-F</u>	<u>Max Psd-F</u>	16.49411
49	Saturday	23	13.08					682.486		
50	Saturday	7	13.06					671.030		
51	Sunday	23	13.05					657.967		
52	Sunday	7	12.97					645.306		
53	Saturday	1	12.87					619.463		
54	Saturday	6	12.82					579.712		
55	Sunday	1	12.80					537.404		
56	Sunday	6	12.74					498.005		
57	Saturday	2	12.71					456.512		
58	Weekday	1	12.69	12.69	12.69	12.69	12.69	417.428		
59	Weekday	5	12.68	12.68	12.68	12.68	12.68	276.757		
60	Sunday	2	12.66					194.686		
61	Saturday	5	12.65					181.784		
62	Saturday	3	12.61					169.714		
63	Saturday	4	12.59					157.534		
64	Weekday	24	12.59	12.59	12.59	12.59	12.59	145.794		
65	Sunday	5	12.59					99.446		
66	Saturday	24	12.55					92.018		
67	Weekday	2	12.54	12.54	12.54	12.54	12.54	84.420		
68	Sunday	4	12.54					53.173		
69	Sunday	3	12.52					48.034		
70	Weekday	4	12.51	12.51	12.51	12.51	12.51	42.880		
71	Weekday	3	12.49	12.49	12.49	12.49	12.49	20.931		
72	Sunday	24	12.42					3.491		

Column A: Day-type = "Sunday," "Weekday," or "Saturday"

Column B: The hour of the day

Columns C-I: Levelized marginal costs of energy; Rows 13, 28, and 43 of Table 5

If "Day-Type" = "Weekday" for the given row, then five identical weekdays of data appear.

Column H: The Pseudo F-Statistic when 2 clusters are separated at the given row

Column I: The maximum Pseudo F-Statistic appears where clusters are divided "optimally."

Table 9
Hours of the Week Designated as Higher (H) or Lower (L) in Cluster Analysis

2

	A	B	C	D	E	F	G
	Hour	<u>Sunday</u>	<u>Weekday</u>	<u>Saturday</u>			
1							
2							

Table 13
Comparison of Proposed Seasons to Seasons Which Minimize
Differences Between Seasonal and Monthly Marginal Costs of Firm Energy

	A	B	C	D	E	F	G	H
51								
52		Seasonal Marginal Costs						
53								
54			<u>HLH</u>				<u>LLH</u>	
55								
56	Oct-Dec, Feb-Mar	18.87					17.838773	
57	Jan, Sep	18.6240168					17.0488523	
58	Apr	16.8355322					16.0799159	
59	May-Jun	9.16596368					7.97986244	
60	Jul	11.2677379					9.81927038	
61	Aug	16.0596369					13.9467578	
62								
63								
64								1.14
	Ratio (Proposed/Difference-Minimizing):							

Column B: Heavy load hour marginal costs of firm energy; seasonal averages calculated using loads in Table 9 as weights for marginal costs from Table 8:
 HLH averages =
 (Table 8, Column G * Table 9, Column B)/Sum(Table 9, Column B),
 for the appropriate months.

Column C: Monthly MC minus seasonal average MC from Column B

Column D: The absolute value of Column C

Column E: Light load hour marginal costs of firm energy; seasonal averages calculated using loads in Table 9 as weights for marginal costs from Table 8:
 LLH averages =
 (Table 8, Column H * Table 9, Column C)/Sum(Table 9, Column C),
 for the appropriate months.

Column F: Monthly MC minus seasonal average MC from Column E

Column G: the absolute value of Column F

Column H: Weighted average of totals of absolute values of deviations of monthly from seasonal values: (Sum of Column D * 4 + Sum of Column G * 3)/7
 Row 64 = Row 13/Row 49

	MCs x Loads		Loads	
	HLH	LLH	HLH	LLH
October	1683.19926	1077.65966	90.5426448	61.082857
November	1842.19526	1182.31048	98.5308876	66.2330627
December	2080.18544	1311.35899	109.885602	73.879277
January	2073.38962	1293.42143	110.381791	74.2307697
February	2060.38139	1327.02411	108.286245	74.0942395
March	1920.23799	1249.61223	100.639985	69.3511664
April	1666.61781	1091.10674	98.9940671	67.8552515
May	845.846108	501.445018	96.4434683	65.9118473
June	923.131823	550.676438	96.5507429	65.9352195
July	1076.90735	639.519219	95.574406	65.1289958
August	1552.09506	915.227139	96.6457128	65.6229318
September	1715.03401	1043.84377	93.0342438	62.8614614

Appendix A

BPA Firm Energy Loads and Hydro Inflows Used to Shape Marginal Cost of Firmness of Energy by Month

A	B	C	D	E	F	G
<u>Year</u>	<u>Month</u>	<u>Native Load aMw</u>	<u>Total Mkt Load aMw</u>	<u>Total Load aMw</u>	<u>Inflows Mwh</u>	<u>Ratio</u>
1999	99JUL	6716	3146	9862	10619339	0.690933
1999	99AUG	6747	3856	10603	5653157	1.395452
1999	99SEP	6604	3366	9970	3786943	1.895642
1999	99OCT	6539	3472	10011	3546641	2.100159
1999	99NOV	6804	3480	10284	3518250	2.104534
1999	99DEC	7242	3746	10988	3864160	2.115608
2000	00JAN	7260	2354	9614	3731430	1.916965
2000	00FEB	7209	2991	10200	3905703	1.770556
2000	00MAR	6951	2560	9511	4983073	1.420046
2000	00APR	6889	2633	9522	8715875	0.7866
2000	00MAY	6795	2787	9582	17124565	0.416319
2000	00JUN	6783	2876	9659	18847584	0.369002
2000	00JUL	6683	2054	8737	10619339	0.612151
2000	00AUG	6715	3012	9727	5653157	1.280097
2000	00SEP	6572	2614	9186	3786943	1.746531
2000	00OCT	6507	2867	9374	3546641	1.966456
2000	00NOV	6771	3152	9923	3518250	2.030732
2000	00DEC	7208	3150	10358	3864160	1.994402
2001	01JAN	7268	2906	10174	3731430	2.028576
2001	01FEB	7216	3781	10997	3905703	1.908986
2001	01MAR	6956	3417	10373	4983073	1.548788
2001	01APR	6894	3671	10565	8715875	0.872734
2001	01MAY	6799	4059	10858	17124565	0.471749
2001	01JUN	6787	3788	10575	18847584	0.403995
2001	01JUL	6688	3960	10648	10619339	0.745976
2001	01AUG	6719	4918	11637	5653157	1.531528
2001	01SEP	6575	4514	11089	3786943	2.108412
2001	01OCT	6509	4575	11084	3546641	2.325261
2001	01NOV	6776	4965	11741	3518250	2.402741
2001	01DEC	7216	4637	11853	3864160	2.282208

Column A: Calendar year.

Column C: Includes Non-generating preference customers and DSI quartiles 1-3.

Column D: Includes generating preference customers, regional IOU's, and all extraregional customers.

Column E: C + D

Column F: Inflows to BPA hydro-system; see Documentation, WP-96-E-BPA-04A, Section VII

Column G: (Column E * 24 * number of days in month)/Column F