

**Table I Market price**

Hour	Energy Price (\$/MWh)	Variance of energy price	Spinning reserve (\$/MW)	Variance of spinning reserve price	Variance of non-spinning reserve price	Non-spinning reserve (\$/MW)
1	21.71	10.86	2	0.3	1.2	0.18
2	17.5	8.75	1.7	0.26	0.9	0.14
3	13.05	6.53	1.27	0.19	0.47	0.07
4	12.15	6.08	1.12	0.17	0.32	0.05
5	13.77	6.89	1.35	0.2	0.55	0.08
6	15.99	8	2.18	0.33	1.38	0.21
7	20.99	10.5	2.17	0.33	1.37	0.21
8	23.01	11.51	2.34	0.35	1.54	0.23
9	23.85	11.93	2.51	0.38	1.71	0.26
10	26.11	13.05	2.69	0.4	1.89	0.28
11	27.23	13.62	2.94	0.44	2.14	0.32
12	27.99	14	2.95	0.44	2.15	0.32
13	28.7	14.35	2.77	0.42	1.97	0.3
14	27.9	13.95	2.87	0.43	2.07	0.31
15	27.55	13.77	2.92	0.44	2.12	0.32
16	27.73	13.86	3.32	0.5	2.52	0.38
17	28.13	14.06	3.23	0.48	2.43	0.36
18	28.56	14.28	2.97	0.45	2.17	0.33
19	28.8	14.4	2.96	0.44	2.16	0.32
20	30.83	15.41	2.73	0.41	1.93	0.29
21	30.81	15.4	2.35	0.35	1.55	0.23
22	29.34	14.67	1.76	0.26	0.96	0.14
23	26.56	13.28	1.57	0.24	0.77	0.12
24	21.15	10.58	1.16	0.17	0.36	0.05

**Table II Unit Data**

Unit	Bus No	Pmin (MW)	Pmax (MW)	Qmin (MW)	Qmax (MW)	Min ON (Hour)	Min OFF (Hour)	Ramp Up (MW/Hour)	Ramp Down (MW/Hour)	qsc (MW)	IniT (Hour)	St Mbtu	Fuel Type	Fuel Price (\$/Mbtu)	cf (Mbtu/h)	bf (Mbtu/MWh)	af (Mbtu/MWh)
1001	4	5	30	-300	300	1	1	15	15	30	1	40	Gas	1	31.67	26.24382	6.97E-02
1002	6	5	30	-13	50	1	1	15	15	30	1	40	Gas	1	31.67	26.24382	6.97E-02
1003	8	5	30	-300	300	1	1	15	15	30	1	40	Gas	1	31.67	26.24382	6.97E-02
1004	10	150	300	-147	200	4	4	150	150	0	8	440	Coal	1	6.78	25.3875	0.010875
1005	12	100	300	-35	120	4	4	150	150	0	8	110	Coal	1	6.78	24.8875	0.010875
1006	15	10	30	-10	30	1	1	15	15	30	1	40	Gas	1	31.67	26.24382	6.97E-02
1007	18	25	100	-16	50	5	5	50	50	0	5	50	Coal	1	10.15	17.82	0.0128
1008	19	5	30	-8	24	1	1	15	15	30	1	40	Gas	1	31.67	26.24382	6.97E-02
1009	24	5	30	-300	300	1	1	15	15	30	1	40	Gas	1	31.67	26.24382	6.97E-02
1010	25	100	300	-47	140	4	4	150	150	0	8	100	Coal	1	6.78	25.8875	0.010875
1011	26	100	350	-1000	1000	4	4	175	175	0	8	100	Coal	1	32.96	26.76	0.003
1012	27	8	30	-300	300	1	1	15	15	30	1	40	Gas	1	31.67	26.24382	6.97E-02
1013	31	8	30	-300	300	1	1	15	15	30	1	40	Gas	1	31.67	26.24382	6.97E-02
1014	32	25	100	-14	42	5	5	50	50	0	5	50	Coal	1	10.15	24.82	0.0128
1015	34	8	30	-8	24	1	1	15	15	30	1	40	Gas	1	31.67	26.24382	6.97E-02
1016	36	25	100	-8	24	5	5	50	50	0	5	50	Coal	1	10.15	24.82	0.0128
1017	40	8	30	-300	300	1	1	15	15	30	1	40	Gas	1	31.67	26.24382	6.97E-02
1018	42	8	30	-300	300	1	1	15	15	30	1	40	Gas	1	31.67	26.24382	6.97E-02
1019	46	25	100	-100	100	5	5	50	50	0	5	59	Coal	1	10.15	24.82	0.0128
1020	49	50	250	-85	210	4	4	125	125	0	8	100	Coal	1	28	22.3299	2.40E-03