

Table S1: Characteristics of the six thermal generation units [27].

Unit	Power limits		Fuel cost coefficients					Ramp rate limits	
	P_{imin} (MW)	P_{imax} (MW)	a_i	b_i	c_i	e_i	f_i	UR (MW/h)	DR (MW/h)
1	50	200	0.00375	2	0	18	0.037	50	50
2	20	80	0.0175	1.75	0	16	0.038	16	16
3	15	50	0.0625	1	0	14	0.04	10	10
4	10	35	0.00834	3.25	0	12	0.045	7	7
5	10	30	0.025	3	0	13	0.042	6	6
6	12	40	0.025	3	0	13.5	0.041	8	8

$$B_{ij} = \begin{vmatrix} 2.2 & 1.1 & -0.1 & -0.1 & 0.1 & 0.4 \\ 1.1 & 1.6 & 0 & -0.1 & 0 & 0.3 \\ -0.1 & 0 & 2.4 & -1 & -1 & -0.7 \\ -0.1 & -0.1 & -1 & 1.9 & 0.7 & 0.4 \\ 0.1 & 0 & -1 & 0.7 & 1.6 & 0 \\ 0.4 & 0.3 & -0.7 & 0.4 & 0 & 2.6 \end{vmatrix} \cdot 0.0001/MW \quad (S1)$$

Table S2: Twenty-four-hour load demand profile for the six-unit test system [27].

Time (h)	1	2	3	4	5	6	7	8	9	10	11	12
Load (MW)	166	196	229	267	283.4	272	246	213	192	161	147	160
Time (h)	13	14	15	16	17	18	19	20	21	22	23	24
Load (MW)	170	185	208	232	246	241	236	225	204	182	161	131

Table S3: Results of the optimal 24-h DED of the thermal generation units using PSO.

Time (h)	Generator power (MW)						Cost (\$/h)
	1	2	3	4	5	6	
1	50.0004	44.0000	20.0004	18.0021	14.0000	32.0000	494.957
2	99.9090	36.3960	17.7392	11.5632	10.0000	24.0081	543.022
3	135.1502	43.6899	18.3693	12.1942	10.5102	16.1871	629.571
4	170.1084	45.2429	20.2699	15.4601	13.0088	12.4327	760.191
5	200.0000	40.2030	19.4766	12.3096	10.3672	12.7329	820.535
6	164.3107	53.0030	20.6627	17.8640	11.5608	12.8900	793.292
7	168.4371	37.4247	15.4756	11.1500	10.0254	12.0792	688.240
8	121.6852	44.3556	18.3827	10.5806	10.9908	12.0114	578.256
9	120.8827	28.3946	15.0000	10.0084	10.0000	12.0075	512.258
10	81.3154	33.1861	17.9705	10.0497	10.0440	12.0445	420.151
11	80.8889	20.9175	15.5303	10.0000	10.0721	12.0000	382.867
12	95.3589	20.9102	15.0832	10.0000	10.0752	12.0342	419.943
13	105.3467	20.1198	15.0000	10.5896	10.1488	12.3411	446.803
14	122.0215	20.0000	15.0203	10.0000	10.0002	12.0008	487.645
15	146.4532	20.0012	15.0000	10.0000	10.1237	12.0149	557.030
16	172.6032	20.0000	15.0035	10.0116	10.0017	12.0000	639.052
17	180.3679	26.2880	15.8509	10.0000	10.1153	12.1993	697.265
18	147.1628	41.7444	20.0050	14.7090	12.1700	12.0062	681.223
19	170.9440	25.7444	15.0021	10.0123	10.0000	12.0089	649.839
20	138.1223	41.4768	18.8175	11.1985	10.0000	13.3715	623.265
21	136.5898	25.5547	15.1016	10.3013	10.0000	12.0008	551.412
22	103.1707	33.7652	16.5101	10.0038	10.0013	12.0608	483.490
23	97.1611	20.3857	15.0282	10.0000	10.0144	12.8061	422.920
24	62.1979	23.1891	15.1922	10.0000	10.0086	12.0013	333.134