

Table 1. Parameters for generators in test system 1

	Bus	$p_i^{g,\min}$ (MW)	$p_i^{g,\max}$ (MW)	$q_i^{g,\min}$ (MVar)	$q_i^{g,\max}$ (MVar)	a_i (\$/MW ²)	b_i (\$/MW)	em_i^{PDS} (ton/MWh)	CER (ton)
Main grid	1	0	10	-10	10	0.0697	56.24	0.865	-
MG 1	16	0	1	-0.5	0.5	0.0218	22.82	0.312	0.1
MG 2	22	0	1	-0.5	0.5	0.0128	14.33	0.625	0.1
MG 3	26	0	0.2	-0.2	0.2	0	0	0	0.05
MG 4	33	0	0.2	-0.2	0.2	0	0	0	0.05

Table 2. Average traffic demand in test system 1

Number	Origin	Destination	q_{rs}
1	1	10	15
2	1	12	10
3	3	10	15
4	3	12	15
5	4	9	10
6	4	10	10
7	4	12	5

Table 3. Parameters for TS in test system 1

Link	Origin	Destination	c_a	t_a^0 (min)	Length (km)
1	1	3	18	6	3
2	1	2	18	3	1
3	2	6	18	6	3
4	1	4	10	5	2
5	2	5	10	5	2
6	3	4	10	5	2
7	4	5	12	6	3
8	5	6	10	5	2
9	3	7	18	3	1
10	4	8	12	6	3
11	5	9	12	6	3
12	6	10	18	3	1
13	7	8	10	5	2
14	8	9	12	6	3
15	9	10	10	5	2
16	7	11	18	6	3
17	8	11	10	5	2

18	9	12	10	5	2
19	10	12	18	6	3
20	11	12	18	3	1

Table 4. Parameters for generators in test system 2

	Bus	$p_i^{g,\min}$ (MW)	$p_i^{g,\max}$ (MW)	$q_i^{g,\min}$ (MVar)	$q_i^{g,\max}$ (MVar)	a_i (\$/MW ²)	b_i (\$/MW)	em_i^{PDS} (ton/MWh)	CER (ton)
Main grid	1	0	50	-50	50	0.0697	96.24	0.865	-
MG 1	13	0	5	-5	5	0.0518	72.82	0.312	0.5
MG 2	22	0	2	-2	2	0	0	0	0.5
MG 3	31	0	5	-5	5	0.0328	54.33	0.574	0.5
MG 4	43	0	2	-2	2	0	0	0	0.5
MG 5	59	0	2	-2	2	0	0	0	0.5
MG 6	92	0	5	-5	5	0.0328	54.33	0.574	0.5
MG 7	111	0	3	-3	3	0	0	0	0.5

Table 5. Average traffic demand in test system 2

Number	Origin	Destination	q_{rs}
1	1	19	150
2	1	20	150
3	2	19	50
4	2	20	50
5	2	21	100
6	3	19	100
7	3	20	150
8	3	21	50

Table 6. Parameters for TS in test system 2

Link	Origin	Destination	c_a	t_a^0 (min)	Length (km)
1	1	2	2500	6	6
2	1	3	2300	4	4
3	2	6	500	5	5
4	3	4	1700	4	4
5	3	12	2300	4	4
6	4	5	1700	2	2
7	4	11	500	6	6
8	5	6	500	4	4

9	5	9	1000	5	5
10	6	8	500	2	2
11	7	18	2300	2	2
12	8	7	750	3	3
13	8	9	500	10	10
14	8	16	500	5	5
15	9	10	1400	3	3
16	10	11	1000	5	5
17	10	15	1400	6	6
18	10	16	500	4	4
19	10	17	500	8	8
20	11	12	500	6	6
21	11	14	500	4	4
22	12	13	2500	3	3
23	13	24	500	4	4
24	14	15	500	5	5
25	14	23	500	4	4
26	15	19	1500	3	3
27	15	22	1000	3	3
28	16	17	500	2	2
29	16	18	2000	3	3
30	17	19	500	2	2
31	18	20	2300	4	4
32	19	20	500	4	4
33	20	21	500	6	6
34	20	22	500	5	5
35	21	22	500	2	2
36	21	24	500	3	3
37	22	23	500	4	4
38	23	24	500	2	2
