



















Table 4  
Data of generator-G power blocks

	a1 (\$/MW <sup>2</sup> /h)	b1 (\$/MWh)	c1 (\$/h)	c2 (\$/h)	c3 (rad/MW)	q <sup>max</sup> (MW)	q <sup>min</sup> (MW)	MUT (h)	MDT (h)	h (\$)	δ (\$)	τ (h)	c <sub>i</sub> <sup>d</sup> (\$)
Block 1	0.00482	7.97	78	150	0.063	200	50	1	1	1000	1500	1	100
Block 2	0.00194	15.85	310	200	0.042	400	100	2	1	1500	2500	1	200
Block 3	0.00156	32.92	561	300	0.0315	600	100	4	2	2000	4000	8	400

Table 5  
Optimal bid prices (in \$/MWh) of generators for each block

	Rival 1	Rival 2	Rival 3	Rival 4	Generator-G	MCP (ISO)
Block 1	9.9838	15.00	10.00	20.044	10.291	13.06
Block 2	19.991	40.20	14.99	24.99	17.65	21.535
Block 3	29.978	50.00	20.00	39.99	34.059	34.808

Table 6  
Dispatched power output of generator-G and rivals

Load (MW)	Hour	Generator-G			Rival-1			Rival-2			Rival-3			Rival-4		
		Block 1	Block 2	Block 3	Block 1	Block 2	Block 3	Block 1	Block 2	Block 3	Block 1	Block 2	Block 3	Block 1	Block 2	Block 3
1500	1	200	400	ND	200	150	ND	ND	ND	ND	250	300	ND	ND	ND	ND
1500	2	200	400	ND	200	150	ND	ND	ND	ND	250	300	ND	ND	ND	ND
1500	3	200	400	ND	200	150	ND	ND	ND	ND	250	300	ND	ND	ND	ND
1500	4	200	400	ND	200	150	ND	ND	ND	ND	250	300	ND	ND	ND	ND
2000	5	200	400	ND	200	50	ND	300	ND	ND	250	300	ND	300	ND	ND
2000	6	200	400	ND	200	50	ND	300	ND	ND	250	300	ND	300	ND	ND
2000	7	200	400	ND	200	50	ND	300	ND	ND	250	300	ND	300	ND	ND
2500	8	200	400	ND	200	300	ND	300	ND	ND	250	300	250	300	ND	ND
3000	9	200	400	50	200	300	400	300	ND	ND	250	300	300	300	ND	ND
3500	10	200	400	200	200	300	400	300	ND	ND	250	300	300	300	350	ND
3500	11	200	400	200	200	300	400	300	ND	ND	250	300	300	300	350	ND
3500	12	200	400	200	200	300	400	300	ND	ND	250	300	300	300	350	ND
2500	13	200	400	ND	200	300	ND	300	ND	ND	250	300	250	300	ND	ND
3000	14	200	400	50	200	300	400	300	ND	ND	250	300	300	300	ND	ND
3500	15	200	400	200	200	300	400	300	ND	ND	250	300	300	300	350	ND
3500	16	200	400	200	200	300	400	300	ND	ND	250	300	300	300	350	ND
3500	17	200	400	200	200	300	400	300	ND	ND	250	300	300	300	350	ND
3000	18	200	400	50	200	300	400	300	ND	ND	250	300	300	300	ND	ND
3000	19	200	400	50	200	300	400	300	ND	ND	250	300	300	300	ND	ND
2500	20	200	400	ND	200	300	ND	300	ND	ND	250	300	250	300	ND	ND
2000	21	200	400	ND	200	50	ND	300	ND	ND	250	300	ND	300	ND	ND
2000	22	200	400	ND	200	50	ND	300	ND	ND	250	300	ND	300	ND	ND
1500	23	200	400	ND	200	150	ND	ND	ND	ND	250	300	ND	ND	ND	ND
1500	24	200	400	ND	200	150	ND	ND	ND	ND	250	300	ND	ND	ND	ND

Table 7  
Performance comparison of different approaches

	FAPSO	IWAPSO	VURPSO	GA	
Total profit (\$)	Best(\$)	94178	92086	91672	91468
	Worst(\$)	93265	90869	89347	88339
	Ave.(\$)	93721	91477	90509	89903
	PD (%)	0.009	0.013	0.025	0.034
Average c.p.u. time (sec)	0.270	0.446	0.648	2.33	