

Table. 1 Electric vehicles parameter settings

parameter	Numerical value	parameter	Numerical value
Percentage of charging electric vehicles(%)	60	Percentage of Discharging Electric Vehicles(%)	30
Average charge and discharge power (kW)	1.8	Charge and discharge frequency (day/time)	1

Tab.2 Thermal power unit parameters

Unit	Upper limit of output/MW	Lower limit of output/MW	Rate of climb/ (MW·h ⁻¹)	Carbon emissions(t/MW·h)	$a_i / (\$ \cdot \text{MW}^{-2})$	$b_i / (\$ \cdot \text{MW})$	$c_i / \$$	Start/stop duration/h
G1	455	150	130	1.05	0.00048	16.19	1000	8
G2	455	150	130	1.03	0.00031	17.26	970	8
G3	130	20	60	0.85	0.002	16.6	700	5
G4	130	20	60	0.87	0.0021	16.5	680	5
G5	162	25	90	0.95	0.00398	19.7	450	6
G6	80	20	40	0.74	0.00712	22.26	370	3
G7	85	25	40	0.76	0.00079	27.74	480	3
G8	55	10	40	0.65	0.00413	25.92	660	1
G9	55	10	40	0.64	0.00222	27.27	665	1

Tab.3 Optimized operating solutions results for different scenarios

Scene classification	Total cost /\$	EV discharge quantity/vehicle	Wind power consumption rate/%	Actual carbon emissions/t
1	1,031,054.41	12,770	80.45	26,559.36
2	835,149.46	45,000	75.54	26,193.01
3	1,024,845.37	23,473	100	22,515.56
4	801,907.16	45,000	100	22,134.03