TABLE I

Details of Generators in 5-Bus System

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Generator name | A | B | C | D | E |
| Bus | 1 | 1 | 3 | 4 | 5 |
| (MW) | 100 | 107 | 492 | 320 | 577 |
| (MW) | 50 | 53.5 | 246 | 160 | 288.5 |
| (tCO2/h) | 50 | 82 | 354 | 219 | 384 |
| (tCO2/h) | +5 | -25 | 0 | +20 | 0 |
| (¥/MW) | 0.45 | -7.01 | 0 | 0.92 | 0 |
| (tCO2/MWh) | 0.55 | 0.85 | 0.80 | 0.76 | 0.74 |
| (¥/MWh2) | 0.01 | 1.4 | 0.026 | 0.01 | 0.021 |
| (¥/MWh) | 40 | 20 | 20 | 40 | 20 |
| (¥/h) | 0 | 64 | 295 | 0 | 346 |

TABLE II

Overall Results of the OPF and C-OPF in An Hour

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| System state | Total power generation cost (¥) | Total carbon-  related cost (¥) | Total electricity-carbon cost (¥) | Total carbon emission (tCO2) | Total power users cost (¥) | Power line congestion cost (¥) | |
| Electricity | Carbon |
| OPF | 37749 | 14489 | 52238 | 750 | 54500 | 641 | -1893 |
| C-OPF | 38627 | 12467 | 51094 | 720 | 52417 | 0 | 0 |
| Increase | 2.32% | -13.96% | -2.19% | -4% | -3.82% | -100% | -100% |