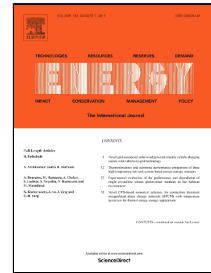


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Peak shaving operation of hydro-thermal-nuclear plants serving multiple power grids by linear programming

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# 1 Peak shaving operation of hydro-thermal-nuclear plants 2 serving multiple power grids by linear programming

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8 **Abstract:** With the rapid economic development in recent years, the peak load demands of China  
9 are experiencing a booming period. As a regional power grid with the maximum electrical load in  
10 the world, the East China Power Grid (ECPG) is in charge of coordinating simultaneously the  
11 power generation of its own power plants to several subordinate provincial power grids. However,  
12 due to unreasonable power structure, there is a lack of flexible energy to quickly respond the peak  
13 loads of multiple power grids, which has brought a new real challenge for the dispatching center  
14 of most regional power grids in China. Hence, to meet the practical requirement of peak shaving  
15 operation in China, a novel linear programming optimization model is proposed in this paper to  
16 find out the optimal quarter-hourly generation allocation plan while satisfying a group of complex  
17 constraints. In this model, the objective is to minimize the summation of peak-valley difference of  
18 the residual load series by subtracting the total allocated generation from the original load of each  
19 power grid. This model is used to solve the day-head peak operation of 14 hydro-thermal-nuclear  
20 plants serving multiple power grids in ECPG. The results from different cases show that  
21 compared with the current method used in practical engineering, the proposed model is capable of  
22 providing results with smoother remaining load series for each power grid. Thus, this method  
23 proves to be effective technique to provide scientific decision support for large-scale generation  
24 allocation of plants serving multiple interconnected power grids in China.

25 **Keywords:** Peak shaving operation; hydro-thermal-nuclear system; linear programming; multiple  
26 interconnected power grids

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