

电力市场

引入SO2排放惩罚价格因子的节能减排发电调度模型及实用算法

韩彬, 周京阳, 崔晖, 李晓磊

中国电力科学研究院, 北京市 海淀区 100192

摘要:

在确定机组开停状态的前提下, 分析了4种节能减排发电调度模型各自的优缺点, 详细分析了第4种模型, 认为第4种模型通过引入SO2排放惩罚价格因子, 能够协调节能和减排2个优化目标, 具有实用性。以某省电网日负荷数据为例, 对4种日前发电计划模型进行了对比分析, 通过调整模型中SO2的惩罚价格因子, 灵活协调发电调度的经济性和环保性, 验证了模型的实用性与有效性。

关键词: 节能减排 日前发电计划 节能发电调度 经济调度 煤耗 惩罚价格因子

An Energy Conservation and Emission Reduction Based Power Generation Scheduling Model Leading in Factor of Penalty Price due to SO2 Emission and Its Practical Algorithm

HAN Bin, ZHOU Jing-yang, CUI Hui, LI Xiao-lei

China Electric Power Research Institute, Haidian District, Beijing 100192, China

Abstract:

Under the presupposition that the startup and shutdown states of units are determined, the respective advantages and defects of four kinds of energy conservation and emission reduction based power generation scheduling models are compared and the fourth kind of model is analyzed in detail. Because of leading factor of penalty price due to SO2 emission into the fourth kind of model, it is considered that the fourth kind of model can coordinate the two optimization objects, namely the energy conservation and emission reduction, so it is practicable. Taking daily load data of a certain provincial power grid for example, four day-ahead power generation scheduling models are contrasted and analyzed. By means of modifying the factor of penalty price due to SO2 emission in the fourth kind of model, the economy and the feature of environment protection of power generation scheduling are coordinated flexibly, thus the practicality and effectiveness of the fourth kind of model are verified.

Keywords: energy conservation and pollution reduction daily generation scheduling energy-conservation based generation economic dispatch coal consumption factor of penalty price

收稿日期 2009-05-11 修回日期 2009-04-14 网络版发布日期 2009-11-16

DOI:

基金项目:

通讯作者: 韩彬1

作者简介:

作者Email: hb_xsp@163.com

参考文献:

[1] 国务院办公厅. 国办发[2007]53号 关于转发发展改革委等部门节能发电调度办法(试行)的通知[S]. 北京: 国务院办公厅, 2007. [2] Gent M R, Lamont J W. Minimum emission dispatch[J]. IEEE Trans on PAS, 1971, PAS-90: 2650-2660. [3] Lamont J W, Obessis E V. Emission dispatch models and algorithms for the 1990s[J]. IEEE Trans on Power Systems, 1995, 10(2): 941-947. [4] Talaq J H, EI-Hawary F, EI-Hawary M E. A summary of environmental/economic dispatch algorithms[J]. IEEE Trans on Power Systems, 1994, 9(3): 1508-1516. [5] Gjengedal T. Emission constrained unit commitment[J]. IEEE Trans on Energy Conversion, 1996, 11(1): 132-138. [6] Lu Bo, Shahidepour M. Unit commitment with flexible generating units[J]. IEEE Trans on Power Systems, 2005, 20(2): 1022-1034. [7] Talaq J H, EI-Hawary F, EI-Hawary M E. A sensitivity analysis

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(328KB)
- ▶ [HTML全文]
- ▶ 参考文献[PDF]
- ▶ 参考文献

服务与反馈

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

- ▶ 节能减排
- ▶ 日前发电计划
- ▶ 节能发电调度
- ▶ 经济调度
- ▶ 煤耗
- ▶ 惩罚价格因子

本文作者相关文章

PubMed

approach to minimum emission power flow[J]. IEEE Trans on Power Systems, 1994, 9(1): 436-442.

[8] Farag A, Al-Baiyat S, Cheng T C. Economic load dispatch and multiobjective optimization procedures using linear programming techniques[J]. IEEE Trans on Power Systems, 1995, 10(2): 731-738.

[9] Ramanathan R. Emission controlled economic dispatch[J]. IEEE Trans on Power Systems, 1994, 9(4): 1994-2000.

[10] Fan Jiyuan, Zhang Lan. Real-time economic dispatch with line flow and emission constraints using quadratic programming[J]. IEEE Trans on Power Systems, 1998, 13(2): 320-325.

[11] 胥传普, 杨立兵, 刘福斌. 关于节能降耗与电力市场联合实施方案的探讨[J]. 电力系统自动化, 2007, 31(23): 99-102.

Xu Chuanpu, Yang Libing, Liu Fubin. Analysis on the project of energy-conservation associated with electricity market [J]. Automation of Electric Power Systems, 2007, 31(23): 99-102(in Chinese).

[12] 王超, 张晓明, 唐茂林, 等. 四川电网节能减排发电实时调度优化模型[J]. 电力系统自动化, 2008, 32(4): 89-92.

Wang Chao, Zhang Xiaoming, Tang Maolin, et al. Real-time dispatching optimization model for energy-saving and emission- reduction generation in Sichuan grid[J]. Automation of Electric Power Systems, 2008, 32(4): 89-92(in Chinese).

[13] 张宁, 陈慧坤, 骆晓明, 等. 广东电网节能发电调度计划模型与算法[J]. 电网技术, 2008, 32(24): 11-15.

Zhang Ning, Chen Huikun, Luo Xiaoming, et al. Model and algorithm of energy-conservation based generation dispatching for Guangdong Power Grid[J]. Power System Technology, 2008, 32(25): 11-15(in Chinese).

[14] 钟海旺, 康重庆, 陈慧坤, 等. 广东电网节能发电调度潜力分析[J]. 电网技术, 2008, 32(23): 7-12.

Zhong Haiwang, Kang Chongqing, Chen Huikun, et al. Analysis on potential of energy-conservation based dispatch for Guangdong Power Grid[J]. Power System Technology, 2008, 32(23): 7-12(in Chinese).

[15] 范玉宏, 张维, 叶永松, 等. 基于机组煤耗高低匹配替换的区域电网节能调度模型[J]. 电网技术, 2009, 33(6): 78-81.

Fan Yuhong, Zhang Wei, Ye Yongsong, et al. Energy conservation generation dispatching model in regional power network based on high-low matching of coal consumption rates of units[J]. Power System Technology, 2009, 33(6): 78-81(in Chinese).

[16] 陈皓勇, 张森林, 张尧. 区域电力市场环境下节能发电调度方式[J]. 电网技术, 2008, 32(24): 16-21.

Chen Haoyong, Zhang Senlin, Zhang Yao. Energy saving power generation dispatching in regional electricity market[J]. Power System Technology, 2008, 32(24): 16-21(in Chinese).

[17] 李晓磊, 周京阳, 于尔铿, 等. 基于动态搜索线性混合整数法的机组组合新算法[J]. 电力系统自动化, 2008, 32(21): 21-25.

Li Xiaolei, Zhou Jingyang, Yu Erkeng, et al. Linear mixed integer programming algorithm for unit commitment based on dynamic search[J]. Automation of Electric Power Systems, 2008, 32(21): 21-25(in Chinese).

[18] 安洪光. 火力发电厂二氧化硫排放量的计算方法[J]. 华北电力技术, 2000(1): 11-12.

An Hongguang. Calculation method on SO₂ emission in fossil-fuel power plants[J]. North China Electric Power, 2000(1): 11-12(in Chinese).

[19] 于尔铿, 刘广一, 周京阳. 能量管理系统(EMS)[M]. 北京: 科学出版社, 2001: 100-160.

本刊中的类似文章

1. 汤伟 王漪 于峰 刘智洋 罗恒桓 金钟鹤 柳进 郭钰锋 于继来 柳焯. 编制直调火力发电单元月度电能交易计划的综合成本加权法[J]. 电网技术, 2009, 33(17): 167-173
2. 陈树勇 宋书芳 李兰欣 沈杰. 智能电网技术综述[J]. 电网技术, 2009, 33(8): 1-7
3. 袁铁江|晁勤|吐尔逊·伊不拉音|童菲. 电力市场环境下的含风电机组的环境经济调度模型及其仿真[J]. 电网技术, 2009, 33(6): 67-71
4. 范玉宏 张维 叶永松 唐学军. 基于机组煤耗高低匹配替换的区域电网节能调度模型[J]. 电网技术, 2009, 33(6): 78-81
5. 张森林. 南方电力市场建设和模拟运行[J]. 电网技术, 2008, 32(10): 28-32
6. 尚金成|张立庆. 电力节能减排与资源优化配置技术的研究与应用[J]. 电网技术, 2007, 31(22): 58-63
7. 张森林. 节能发电调度实用化措施框架体系[J]. 电网技术, 2008, 32(20): 81-85
8. 张宁|陈慧坤|骆晓明|李嘉龙|夏清|康重庆. 广东电网节能发电调度计划模型与算法[J]. 电网技术, 2008, 32(24): 11-15
9. 陈皓勇 张森林 张尧. 区域电力市场环境下节能发电调度方式[J]. 电网技术, 2008, 32(24): 16-22
10. 薛斌|唐卓贞|朱健全|王佳佳. 一种无功优化快速求解方法[J]. 电网技术, 2008, 32(26): 68-70
11. 钟海旺|康重庆|陈慧坤|骆晓明|李嘉龙. 广东电网节能发电调度潜力分析[J]. 电网技术, 2008, 32(23): 7-12
12. 尚金成. 兼顾市场机制的主要节能发电调度模式比较研究[J]. 电网技术, 2008, 32(4): 78-85
13. 尚金成. 兼顾市场机制与政府宏观调控的节能发电调度模式及运作机制[J]. 电网技术, 2007, 31(24): 55-62
14. 王惠文|是艳杰|李红莉|赵碧光|朱春. 生物质发电的节能减排效果分析[J]. 电网技术, 2007, 31(Supp2): 344-346
15. 尚金成. 基于时间尺度的节能发电优化调度协调模型及算法[J]. 电网技术, 2008, 32(15): 55-61