



Economic dispatch in the electricity sector in China: potential benefits and challenges ahead

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Hao Chen, Chi Kong Chyong, Jia-Ning Kang, Yi-Ming Wei

Abstract

Unlike the economic dispatch used in most power systems, electricity system dispatch currently used in China is an equal share approach. This form of dispatch has been criticized for its negative influence on system operations, worsening energy security, environmental sustainability and affordability problems. To contribute to on-going electricity market reform discussions, our study employs an optimization model to quantify the economic dispatch savings in the coal-fired power sector. We offer three major findings. First, the heat rates of coal generators in China in 2014 ranged from 273.91 gce/kWh to 348.38 gce/kWh units and as a result of these large differences among generators in different regions, implementing economic (merit order) dispatch will bring economic and environmental benefits. Second, we identify three major political and economic challenges, which hinder the transition from the current dispatch model, namely (i) current running hours are insufficient for cost recovery, (ii) limited cross-border trading due to electricity over-supply and local protectionism, and (iii) political economy problems from generators of different ownership types. Finally, 5.67% of coal used in power generation could be saved if economic dispatch was employed at the provincial level, the value of which equals 0.05% of Chinese GDP in 2014.

Keywords: Economic dispatch; electricity; power markets; energy saving; China; coal; optimization model

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Contact
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wei@bit.edu.cn & k.chyong@jbs.cam.ac.uk

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