

## An Integrated Approach to Backup Reserve and Wheeling Pricing in Electricity Markets

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### Abstract

During its current drive toward a complete open electricity market structure, the Saudi Electricity Company (SEC) is presently dealing with a special business operating environment in which some of its major consumers are in a position to offer and compete for surplus generation as well as request wheeling of firm power and/or reserve among their local facilities using the main grid. When the company owning the grid also has its own generation, as in the current situation with SEC, while other major consumers buys from SEC as well as sell to surplus power from their local generating facilities, a balanced pricing strategy is of an extreme importance. Such balanced strategy should ensure perceived benefits to both the buyer and the seller.

This work presents an integrated approach to equitable pricing of backup reserve and wheeling, which attains a balanced strategy that ensures perceived benefits to both the buyer and the seller. In the proposed pricing model, the generating entities submit bids to the grid for both firm and reserve powers as well as optional wheeling of firm and/or reserve powers. Several related issues are discussed in the paper, including: 1) fulfilling local firm real (and reactive) power demand requirements, 2) fulfilling local power reserve requirements, 3) buying firm real (and reactive) power from the grid, 4) buying reserve power from the grid, 5) exporting firm real (and reactive) power demand to remote load centers via the grid, 6) exporting reserve power via the grid, 7) wheeling of firm power demand to remote owned sites using the grid, and 8) wheeling reserve power to remote owned sites using grid. A practical application is also presented in the paper for demonstration purposes.

**Key-words:** Electricity markets, Integrated pricing, Backup reserve, Wheeling